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## **ECTS: Teaching Innovation Experience in Business Administration at the Escuela Superior de Ingeniería (College of Engineering) in Cádiz**

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### **1. Introduction**

The European Credit Transfer System means, as well as specific measures for the convergence of European university degrees, the need to raise new ways of teaching and learning. This is a change-oriented education to put in the student activity and develop their skills and abilities. This new approach to education focuses on students and their ability to learn and it requires more prominence and higher shares of compromise, while the teacher becomes a companion in the process of learning that helps the student to achieve certain tasks.

In this context, we have been working in the introduction of ECTS, as a pilot project at the College of Engineering (ESI) in Cádiz (hereafter with orthographic stress) . We are trying to involve our pupils in different methods of active learning and continuous assessment.

In this paper we offer the results of our three years experience concerning our adaptation to the European Credit Transfer System (ECTS). The introduction of the ECTS model experience at the Escuela Superior de Ingeniería (College of Engineering) in Cádiz and specifically in the Bachelor of Science in Mechanical Engineering degree and in the second cycle of Engineering Management, led us to adapt some of our subjects -Business Administration and Production Management, Problem Solving Techniques in Industrial Organizations and Competitiveness and Innovation- in Business to this new way of teaching.

We intend to analyse the results of our findings and compare them with those obtained in these subjects over a period of time which will allow us to compare traditional teaching with the ECTS model.

Our approach has been carried out on the following aspects: the contextualization of these subjects, the methodology used, criteria and method of assessment, valuation of results, conclusions and proposals for improvement.

Moreover, we will contrast the students' opinions about the teaching-innovation experience carried out in one of the subjects studied, "Competitividad e Innovación en la Empresa" (Competitiveness and Innovation in Business).

## 2. Teaching previous to the introduction of ECTS

Higher education is generated and developed within a social context, thus becoming a basic component of every society's cultural development. As every cultural and scientific device, it is constantly evolving in the same way as the society from which it takes its elements and to which it yields its achievements. However, evolutionary changes require a careful process of thinking, critical analysis and political sensibleness. Hence, we need to tackle changes within the university system without missing the right path towards progress as encouraged by the cultural and scientific knowledge provided by universities (CIDUA, 2005).

Within this context, we will make an outline of the previous situation before showing where we are heading for by describing our present teaching experiences within the Business Administration department at the Escuela Superior de Ingeniería (College of Engineering) in Cádiz.

### 2.1 The European Higher Education Space (EHES)

The outstanding changes in our environment have had two important consequences for institutions (Lowendahl & Revang, 1998): 1.- Market orientation is viewed in a different way as clients are not anonymous any more but full-name persons, and 2.- The need for knowledge workers is gradually growing, leading us towards the economy of knowledge on the threshold of the 21<sup>st</sup> century.

The university is not unaware of this changing situation as these transformations of its environment have important consequences for the university itself. Basically there have been four relevant changes for universities (Keller, 1998): the excessive number of students due to the demand for higher-level knowledge; the changes in university funding due to restrictions and limitations of public expenditure; the new information technologies, which facilitate new ways of searching for and accessing information; and the growing demand for permanent training as a consequence of a greater social demand for skilled workers.

Three other relevant changes (Vilalta, 1998) should be added to the ones already mentioned: An increasing international competitiveness for funding, higher social requirements regarding the quality of university services and actions together with the controversy over the traditional assumptions for university recognition.

As an indisputable agent in the task of creating and spreading knowledge, the university should not obviate the above-mentioned changes. Apart from taking specific actions towards the convergence of European university degrees, the EHES will thus involve the need of proposing new ways of teaching and learning so as to meet the threefold purpose of creating and spreading knowledge, adequate professional training as required by the production system, and educating citizens for their whole commitment with social, political and cultural life together with the making of a more democratic society based on the ideals and principles of equality, solidarity and justice.

Within the guidelines put forward by the European Higher Education Space, special attention is devoted to the student-as-learner as the main objective of the teaching processes. The university system will thus provide the material, professional, human, organizational and educational resources required by students in order to improve the quality of their learning process. The training of competent professionals and citizens should include the

knowledge, attitudes and abilities required from them to get fully and efficiently involved in their personal, social and professional life.

Therefore, the redefinition of higher education goals assumed by the European convergence process involves a deep change in the teaching approach carried out so far by universities, as shown in Table 1 below (Benito & Cruz, 2005).

<b>Traditional Teaching</b>	<b>ECTS Teaching</b>
teaching contents	teaching to learn
content-centered	student-centered
technical training	comprehensive training

Table 1. Traditional vs ECTS Teaching.

This is a new life-long learning approach. As stated by Delors (1996), “each individual’s accumulation of knowledge reserves from an early age as a supply of unlimited resources at a later stage is not enough. Moreover, she should be prepared for cashing in on every chance she may have in her life for updating, deepening and enriching her early knowledge and for being able to adapt to a constantly changing world”.

## 2.2 Our subjects

As previously stated in the introduction to this chapter, we will analyse three of our subjects: two of them belong to the second-cycle degree on Industrial Organization Engineering: Problem-Solving Strategies in Industrial Organizations and Competitiveness and Innovation in Business. The other subject belongs to the Industrial Technical Engineering branch of Mechanical Engineering: Business Administration and Production Management. Our approach will include the following aspects: contextualization of each subject, teaching methodology and assessment.

### 2.2.1 Business Administration and Production Management

Business Administration and Production Management is a course included within the Industrial Technical Engineering branch of Mechanical Engineering offered by the Department of Business Management to first year students during the second four-month term in our College. It is a main 6-LRU-credit (or 4.5 ECTS credits) subject. Credits are distributed evenly between theory and practice.

Our aim is that, taking into account the integrating approach of business management, students should acquire the ability to assess and analyse tactical and strategic aspects directly related to production management from a theoretico-practical perspective.

It is the only subject within this degree with an economy-oriented content, although centred upon production. It is therefore a stand-alone subject whose skills and knowledge are not linked to any of the other subjects.

During the 04-05 year, we followed a traditional teaching method: formal lectures together with problem solving and theoretical explanations. At the beginning of the course, the students had access to the learning materials necessary to follow the lessons: a handbook with the different units corresponding to the course syllabus, including the formulation of the problems to be solved. Lessons had a theoretico-practical orientation. In spite of being

formal lectures, we invited students to take an active part in their learning process, by making the lessons as dynamic as possible.

During the 04-05 course, the assessment of this subject was carried out by means of a final exam divided into two parts: theory and practice. The final overall qualification was the result of the arithmetic mean between both parts as far as at least 40% of the score was reached in each part. This qualification could be increased regarding participation as well as the works done and presented and handed in in class.

### **2.2.2 Problem-Solving Strategies in Industrial Organizations**

Problem-Solving Strategies in Industrial Organizations is a second-year, first-term subject within the Industrial Organization Engineering degree. It is a main 6-LRU (4.5-ECTS) credit subject. Credits are distributed evenly between theory and practice.

Theory contents centre upon problem resolution as 'quantitative methods' are essential in this subject. The main purpose of this subject is not only problem solving itself, but also to get to know the adequate approach for each one of the situations we might come across when dealing with service and industry business management. Within this context, our goal is to introduce a set of strategies to help managers cope with decisions. Up to the academic year 04-05, a traditional teaching method was carried out: formal lectures together with the explanation and resolution of set problems.

The assessment of this subject was carried out by means of a final exam consisting of a number of exercises about the contents specified on the subject's syllabus (100%).

### **2.2.3 Competitiveness and Innovation in Business**

Competitiveness and Innovation in Business is a first-term subject also taught in the second year of the Industrial Organization Engineering degree. It is a main 3-LRU (3-ECTS) credit subject. Credits are distributed evenly between theory and practice.

Its goal is for students to reach a satisfactory level of knowledge regarding the role of innovation and its implications with organizational competitiveness. (Universidades Andaluzas, 2004).

The subject is divided into two parts: part one has five topics while part two has only one. These topics supplement and expand those acquired in the previous year's subjects Business Strategies and Policies I and II, though this time clearly oriented to innovation processes.

A teaching methodology closer to the traditional approach was followed up to the 06-07 academic year: Formal lectures and guided outlines for case analysis as well as in-class individual and/or collective tutorials (Universidad de Cádiz, 2007).

This subject was assessed by applying a 30% weight to class activities (essays and oral presentations, case debates, etc.) results and a 70% to a compulsory final exam result. This exam should be passed with a minimum score of 4/10 to be added to class activities results.

## **3. ECTS Experience**

We need to face the process of convergence with Europe as an effort to improve the quality of the public services offered by the university by innovating the traditional ways of teaching and learning (Pérez Fernández & Cervera, 2008).

It basically consists in changing the traditional model –oral transmission of knowledge, note-taking and reproduction of transmitted knowledge through tests and exams– into a new approach which would strengthen the tutorial nature of the university’s educational role, paying attention to each student’s specific professional and academic learning needs (CIDUA, 2005).

Taking these basic principles as a starting point, in this chapter we will show the teaching experiences affecting three of our subjects –Business Administration and Production Management, Problem-Solving Strategies in Industrial Organizations and Competitiveness and Innovation in Business. What used to be a model experience will be compulsory in the coming years for all the subjects at the Escuela Superior de Ingeniería de Cádiz and the acquired knowledge will encourage the transmission of knowledge. Our approach will include the following aspects: contextualization of each subject, teaching methodology and assessment.

### 3.1 Competences and Abilities

Once the subjects have been contextualized in section 2.2, in this section we will deal with the consequences of changing the traditional model with this new approach. This involves a different way of learning based not only on each course’s specific knowledge, but also on a number of abilities and skills corresponding to a variety of competences making a complete description of each subject and, in turn, of each degree.

Table 2 schematically shows the competences to be applied and developed by students doing any of the three subjects analysed in this chapter.

	Business Administration and Production Management	Problem-Solving Strategies in Industrial Organizations	Competitiveness and Innovation in Business
Cognitive Competences (To know)	Estimate and planning of work and design techniques.	Knowledge of basic concepts of design and systems administration.	Innovation. Management systems. Business administration. Processes and systems. Business policies and strategies. Accountancy and finance.
Procedural/Instrumental Competences (To know how)	Assessment and treatment of expenses. Planning.	Modelling complex situations. Computer-aided problem solving. Decision-making. Interpretation of results. Improvement in management.	Technological innovation management. Quality management. Planning and development of new processes and products. Strategic Planning. Administration Systems Design. Legislation.

Generic transversal competences	.	Ability for analysis and synthesis. Ability for solving problems. Autonomous learning. Ability for applying knowledge to practice. Ability for team working. Appropriate handling of bibliography.	1.Instrumental: Ability for analysis and synthesis. Ability for planning and management. Oral and written communication in mother tongue. Ability for information management. Ability for solving problems. Ability for making decisions. 2.Personal: Team work. Interpersonal relations skills. Scientific reasoning. Ethical commitment. 3.Systemic: Autonomous learning. Ability to face new situations. Creativity. Initiative and enterprising spirit. Concern for improvement.
Attitudinal Competences	Leadership, decision-making and teamwork.	Quantitative reasoning. Critical awareness and responsibility. Appreciation of autonomous learning. Show interest in the widening of knowledge and information search.	Critical awareness and responsibility. Ability for deep thinking. Appreciation of autonomous learning. Appreciation of the relevance of teamwork. Show interest in the widening of knowledge Flexibility. Result orientation. Initiative. Ability for connecting with the surrounding environment.

Table 2. Competences to be developed by students.

### 3.2 Methodology: lessons and assignments

#### 3.2.1 Business Administration and Production Management.

As a consequence of the introduction of the ECTS model experience in the Bachelor of Science in Mechanical Engineering degree at the Escuela Superior de Ingeniería (College of Engineering) in Cádiz during the academic year 2005-06, we intended to adapt our subject

Business Administration and Production Management to this new way of teaching by reducing the weight of formal magisterial lectures in favour of encouraging the participation of students.

In the same way as during the 04-05 year, since the very beginning students had access to the handbook which included the main topics and a list of problems. As an innovation, in order to make the work and participation of students easier, a book with a full collection of solved and explained problems was edited by midterm.

However, a new, completely different approach to the one we had had on the previous course was made clear right from start. Hence, some of the set only-theory units of the course should be prepared by the students themselves being aided by the teacher in tutoring sessions.

As for assessment, the students made up work groups. Both group (power-point presentation) and individual (answers to individual questions) work were assessed. It was a success as 64.81% of students registered chose this option from start. The groups were to make two oral presentations on the theory topics. They should defend their presentations individually by answering set questions.

In class, we started with the first theoretico-practical unit from the syllabus by explaining both the theory and its associated problems. Regarding the practical part of each unit, we should point out that they were reluctant to take the floor and publicly show their work.

The main problem with introducing the new methodology was overcrowded classrooms, which hindered the beginning of the "pilot experience".

During the 06-07 year, we used an approach similar to the one in the preceding course. Oral presentations and lesson planning were organized in the same way, although our experience was used for providing more accurate instructions and organizing the role of students in oral presentations in a better way.

Concerning resources, bibliographical references were available from the beginning of the term. A major innovation was the implementation of the course within the UCA's Virtual Campus platform (<http://www2.uca.es/escuela/ingenieria>), which allowed us to introduce new aspects and improvements, namely, the course chronogram, teacher's slide shows, activities and handouts counting for the students' assessment, interesting links (videos, pictures of manufacturing plants, specialized papers, etc.); communications tools, such as a chat line where students could posit and solve their doubts amongst themselves, or by making queries to the teacher, and, last but not least, practice tests from previous courses together with solved tests so that they could check them before revisions.

### **3.2.2 Problem-Solving Strategies in Industrial Organizations**

Although this subject was not involved in pilot experiences during the 05-06 course, we started to work in this line from that year. Thus, a few innovations were introduced, including the implementation of this course in the Virtual Campus Moodle platform. Materials were available to students prior to class presentation and they were asked to hand in the practices corresponding to presented topics in order to assess daily work.

Practice sessions were carried out by organizing students into small groups (up to three students). This way of working did not seem adequate as most of them preferred to work individually.

During the 06-07 academic year, as we tried to adapt to this new teaching approach, a number of innovations added to the ones already going on: practice tests, assessment of

attendance, implementation of 24-hr communications tools allowing students to make interesting questions or queries about the subject to be replied by either the teacher or peer students.

### 3.2.3 Competitiveness and Innovation in Business

In the same line as the case above, the methodology was radically changed from the 06-07 year, although by then this subject was not involved in a pilot experience.

Due to the good results of the 06-07 course, the 07-08 syllabus featured the same methodology. However, after a few years teaching this subject we have verified that students having decided to attend lessons rarely gave up, as it is a second-cycle subject, with only a few students, most of them with their own jobs, and therefore committed to the specific subjects they took up. Based on this experience, during the second lesson we asked students if they were willing to get more involved, taking part in oral presentations and making weekly assignments to be shared by the rest of the group, etc. so that they could skip the exam. They were all for this option. This proposal was based on our experience of previous years regarding the high level of class attendance and students' participation. Hence, the methodology would be basically the same, except for the demand of a greater commitment to "daily work" (De Miguel, 2004).

The proposal consisted in changing the criteria of assessment by altering percentages: 70% would be for set activities and 30% for the exam, which would thus be optional. To benefit from this alternative, students should regularly attend lessons –which could be easily controlled as there were 14-16 attending students.

In addition, they should keep a log book (Universidad de Cádiz, 2007, b-c) where they should outline daily work. This outline would consist of both theoretical contents and cases analysed in the class. They should also keep a record of all individual, group and class set activities.

### 3.3 New resources and in-class introduction of ICTs

The introduction of ICTs (Information and Communication Technologies) has greatly contributed to the change in methodology. Things have been gradually changing as our university has dedicated large sums to equip the various campuses with appropriate hardware/software technology.

Funding for hardware could be divided into two groups: general and class-specific fundings, which include new and more powerful network servers, full campus wiring, the introduction of a wifi network throughout university premises, videoconference rooms in all colleges and faculties, new computing rooms and the option for students to borrow laptops from the libraries.

Regarding classrooms, teachers' desks are all equipped with fixed computer systems and video projectors. These equipments have access to the Internet, providing the class with online teaching resources and applications (e.g. access to virtual classroom) together with other complementary resources from the Internet or from the university intranet.

Regarding software, the virtual classroom plays an outstanding role, allowing teachers to expand their teaching activity beyond classroom periods and being increasingly used by staff. It is a permanent aid for teachers as they can include contents in a variety of formats, namely .pdf and powerpoint presentations, videos, weblinks, and so on. Moreover, the

virtual classroom forums are used not only for online discussions but also as a task submission and assessment site. All in all, innovations galore. To cash in on these resources, the teacher should change her way of thinking and her traditional methods. She should acquire the appropriate training and be keen to learn so as to adequately use these tools with students, with the trade-off that most students are more used to interacting with these platforms than the teachers themselves.

In this line, the three subjects in this analysis have been implemented in the virtual classroom. They have been gradually provided with a greater amount of contents and forums where students may interact with the teacher and/or other students, as well as assessable assignment forums. Teachers have thus made a great amount of effort to get the appropriate training in the new applications and to adapt materials to them. However, this should be viewed as a current investment to yield better results in coming years. As a result, the contents of the subject Business Administration and Production Management have been hooked up to the university's OCW platform, making them available for everyone (<http://ocw.uca.es/organizacion-de-empresas/administracion-de-empresas-y-organizacion-de-la>).

New technologies have allowed us to introduce other innovations in the Competitiveness and Innovation in Business lessons, where Internet access has been used by the teacher to illustrate class examples with a variety of business websites and videos. As we first introduced these resources during the 2007-08 academic year, by the end of term students were asked their opinions about ICT usage. More precisely, they were asked whether accessing business websites, online applications, videos and blogs during lessons were novel activities as compared to other subjects of their degree. The results are pictured (Cervera & Beira, 2008) in the pie chart below (fig.1), where values range between 0 (utterly disagree) and 5 (fully agree or fully adequate).

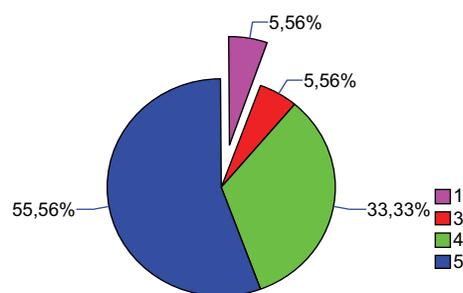


Fig. 1. Use of ICTs has been innovative.

They were also asked whether the subject would improve with the inclusion of links to all virtual classroom resources.

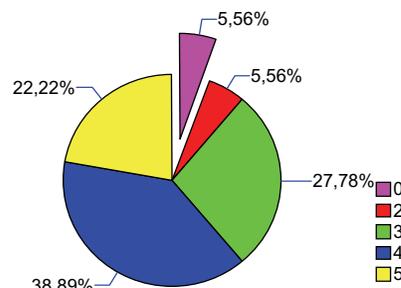


Fig. 2. The inclusion of virtual classroom contents improves virtual classroom.

As a result of students' suggestions during the 2008-09 academic year, the virtual classroom has been increasingly adding all the online resources used in the lessons. Furthermore, we have been trying to apply this approach to the other subjects. The virtual classroom has been a valuable aid for the student's training, monitoring and assessment.

### 3.4 Assessment of academic results

In this section we will analyse the academic results for all those subjects included within the pilot experience, as compared to results from previous years when assessment relied only on written theory and practice tests.

#### 3.4.1 Business Administration and Production Management.

As stated above (section 2.2.1.), during the 04-05 course, the assessment of this subject was carried out by means of a final exam divided into two parts: theory and practice. The final overall qualification was the result of the arithmetic mean between both parts as far as at least 40% of the score was reached in each part. This qualification could be increased regarding participation as well as the works done, presented and handed in in class.

During the 05-06 year, assessment was considerably changed. Two theory tests were performed consisting in oral presentations of main topics. Each student was assessed individually through a set of questions about the topics. If the result was over 2 out of 5, the results of both tests would be added making an arithmetic mean with the results of the objective test done in class on the rest of units. The final exam was structured into two tests, a practice test –consisting in solving problems similar to the ones solved in class- and a theory test –on units 5, 8, 9, 10, 11, 12 and 13. In order to calculate the theory-practice mean a minimum score of 4 out of 10 was required in each part.

During the 06-07 course, the criteria of assessment were similar to those of 05-06. However, a better monitoring of the students' work has been carried out on the virtual classroom. The following aspects were particularly assessed: 5% for problems solved by students in class (two problems were required during the course), 5% for submission of enlarged summaries of topics introduced in lectures. The other 90% was assessed by theory and practice exams, with the same marking. To be able to apply the mean between theory and practice they should score at least 35% (out of the 90% corresponding to both tests within the overall results of the course). The theory exam was divided in turn into two parts: An oral presentation exam (50% of overall theory results) and an objective test for the rest of the

units (remaining 50%). In the same way, the practice exam consisted of a number of problems scoring half the overall qualification.

We must make it clear that these criteria were applied only to those students who regularly attended lessons. Those students who did not attend lessons regularly were offered both a theory and a practice exam based on the syllabus contents.

Table 3 shows the number of registered students as well as the number of submitted and passed tests for three official exam calls. Table 4 shows rates for academic results by means of success and performance rates for the different calls. The success rate is measured as the quotient between passed and submitted tests; on the other hand, the performance rate is measured as the quotient between passed and registered students. On the other hand, figures 3 and 4 show the data collected from tables 3 and 4.

EXAM CALLS	REGISTERED	SUBMITTED	PASSED
JUNE 04/05	128	98	51
JUNE 05/06	108	71	8
JUNE 06/07	136	88	39

Table 3. Academic results.

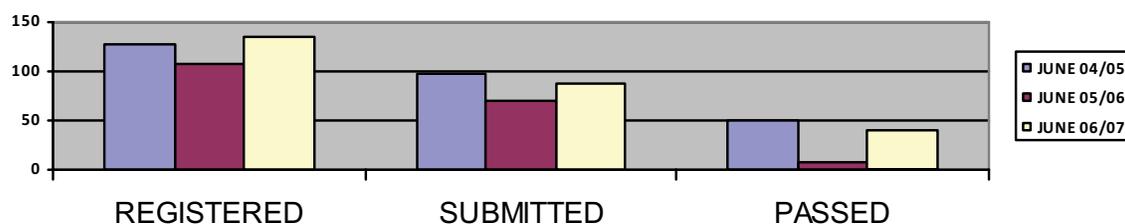


Fig. 3. Registered students, submitted and passed tests in the different calls.

EXAM CALLS	SUCCESS RATE	PERFORMANCE RATE
JUNE 04/05	52,04%	39,84%
JUNE 05/06	11,27%	7,41%
JUNE 06/07	44,31%	28,68%

Table 4. Academic results rates.

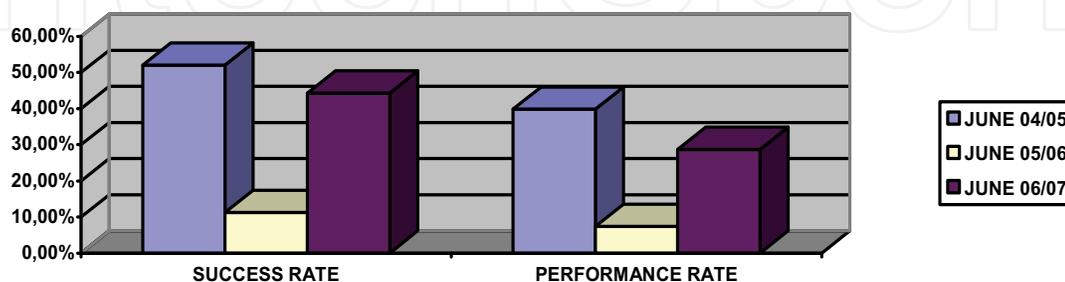


Fig. 4. Success and performance rates for the different calls.

### 3.4.2 Problem-Solving Strategies in Industrial Organizations

During the 04-05 year, the assessment of this subject was carried out by means of a final exam consisting of a number of exercises about the contents specified on the subject's syllabus (100%).

In the 05-06 year, assessment was the same as for the previous year, except for a 5% coming from the results of submitted practices.

Since the 2006-07 academic year there have been major changes in the assessment system. Two options were suggested: The first option features the student not willing to carry out the activities set out throughout the year. In this case, the student is assessed by a final exam consisting in solving a variety of exercises on the contents specified on the subject's syllabus (100%). Class attendance is assessed (5%) from at least 70% attendance to complete sessions. The second option features the student willing to carry out the activities set out throughout the year, in which case assessment will be carried out in the following way: hand-in tests for units 1 to 4 (10%), hand-in tests for units 5 to 8 (10%), final exam (80%).

To be able to access the hand-in test the student is required to have submitted all set exercises in due course. Finally, class attendance will be assessed (5%) from at least 70% attendance to complete sessions.

Table 5 shows registered students as well as submitted and passed exams for the different calls. Table 6 shows academic results rates by means of success rate and performance rate for the different calls. On the other hand, figures 5 and 6 show the data collected from tables 5 and 6.

EXAM CALLS	REGISTERED	SUBMITTED	PASSED
FEBRUARY 04/05	40	20	10
FEBRUARY 05/06	48	26	18
FEBRUARY 06/07	39	17	15
FEBRUARY 07/08	38	21	18

Table 5. Academic results.

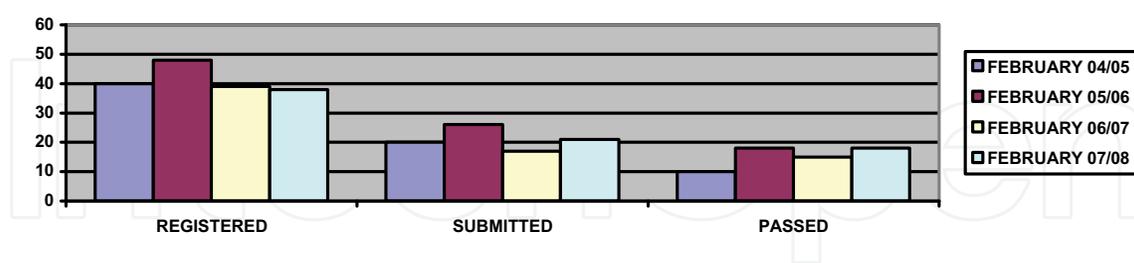


Fig. 5. Registered students, submitted and passed tests in the different calls.

EXAM CALLS	SUCCESS RATE	PERFORMANCE RATE
FEBRUARY 04/05	50%	25%
FEBRUARY 05/06	69,23%	37,5%
FEBRUARY 06/07	88,24%	38,46%
FEBRUARY 07/08	85,71%	47,37%

Table 6. Academic results rates

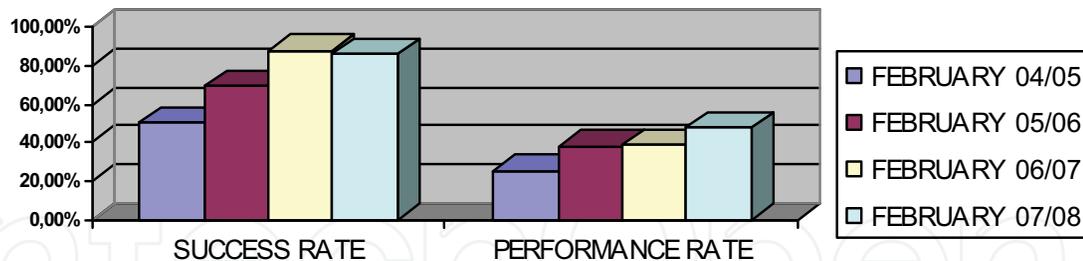


Fig. 6. Success and performance rates for the different calls.

### 3.4.3 Competitiveness and Innovation in Business

During the 06-07 academic year, this subject was assessed by applying a 30% weight to class activities (essays and oral presentations, case debates, etc.) results and a 70% to a compulsory final exam's results. This exam should be passed with a minimum score of 4/10 to be added to class activities results, as shown above in section 3.2.3.

As explained above, in the 07-08 second class there was a change in the way of working, which brought about a new way of assessment which basically consisted in changing percentages: 70% for daily work and 30% for an optional exam. Therefore, those who kept daily set activities up to date and passed them could reach a remarkable (up to B+) result.

The work carried out consisted in two novel individual activities; critical and extensive reading of six papers which were also to be summarised; working on a topic related to the concept of organization leading to the submission of an organization chart thereof; making a summary of all theory units; making oral presentations in groups on the additional references about innovation. We finally assessed extra, optional activities related to innovating experiences in different areas. These activities were all registered on a logbook students should keep updated and finally submit for assessment (70%).

Table 7 shows the number of registered, submitted and passed students for the different calls. Table 8 shows the academic results rates by means of the success rate and the performance rate in the different calls. On the other hand, figures 7 and 8 show the data yielded from tables 7 and 8.

CALLS	REGISTERED	SUBMITTED	PASSED
FEBRUARY 06/07	36	21	20
FEBRUARY 07/08	30	22	22

Table 7. Academic results

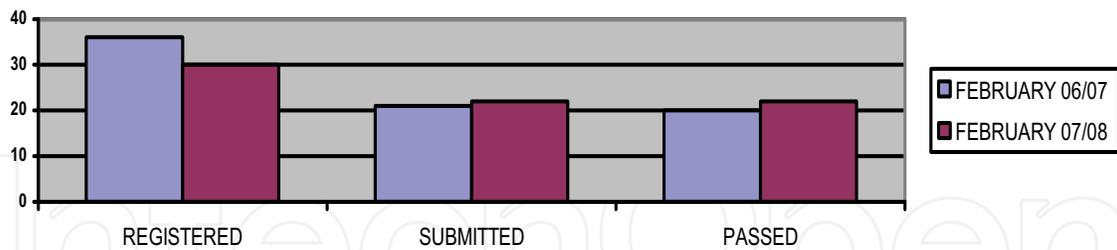


Fig. 7. Registered students, submitted and passed tests in the different calls.

EXAM CALLS	SUCCESS RATE	PERFORMANCE RATE
FEBRUARY 06/07	95,24%	55,55%
FEBRUARY 07/08	100%	73,33%

Table 8. Academic results rates.

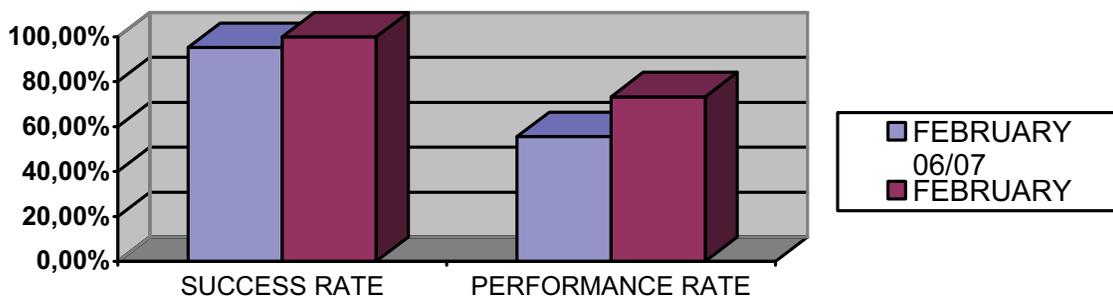


Fig. 8. Success and performance rates for the different calls.

Students taking this subject during the 07-08 academic year were given the following end-of-term questionnaire:

1º) Why have you taken up the Industrial Organization Engineering degree? Tick one or several of the following options:

a) Personal interest. b) Professional interest (as it is/will be demanded by my employers). c) both.

2º) Regarding the two types of assessment of this subject, namely traditional (i.e. exam + assignments) and alternative (i.e. logbook + assignments + participation), which of them has made a greater contribution to your learning?

a) Traditional. b) Alternative.

3º) The teaching methodology used is suitable for the "alternative" system of assessment. 0-1-2-3-4-5

4º) This assessment method encourages your work. 0-1-2-3-4-5

5º) This assessment method encourages group work. 0-1-2-3-4-5

6º) Group work improves your perception of the subject's contents. 0-1-2-3-4-5

7º) Group work encourages the debate on subject-related topics. 0-1-2-3-4-5

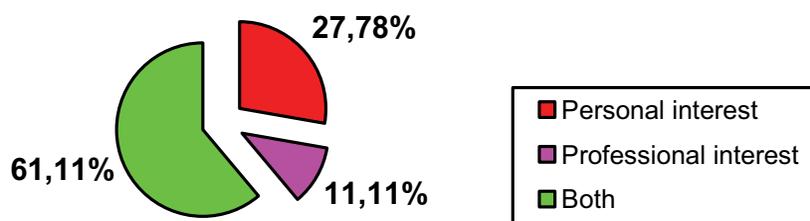
8º) The resources used by the teacher have been innovative as compared to other subjects. 0-1-2-3-4-5

9º) Using the virtual campus resources for teaching this subject would be a boost. 0-1-2-3-4-5

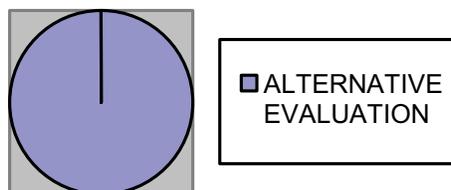
Grading: 0 (utterly disagrees, completely inadequate) up to 5 (fully agrees, fully adequate).

Figures 9 to 17 below show the questionnaire results by means of pie charts.

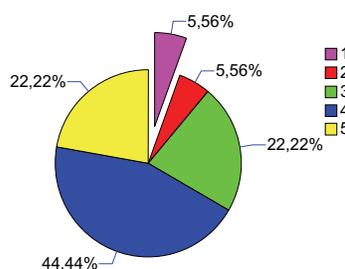
1º) Most students took up the IOE degree driven by both personal and professional interests, personal interest predominating over professional interest (fig. 9).



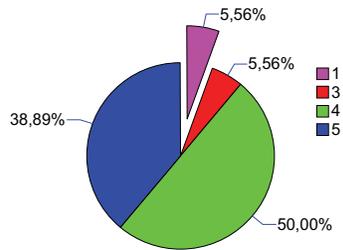
2º) 100% of students prefer the alternative way of assessment as opposed to the traditional one (fig.10).



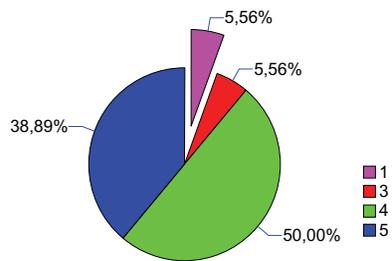
3º) The adequacy of the teaching methodology used yields the following percentages (fig. 11).



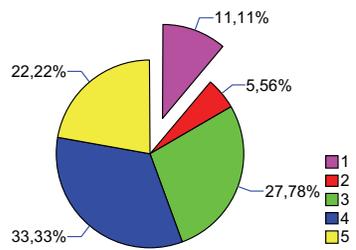
4°) The adequacy of the assessment method used yields the following percentages (fig. 12).



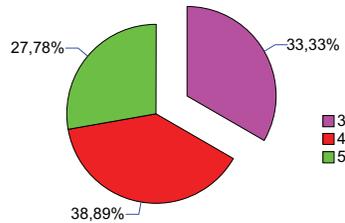
5°) "This assessment method encourages group work" yields the following percentages (fig. 13).



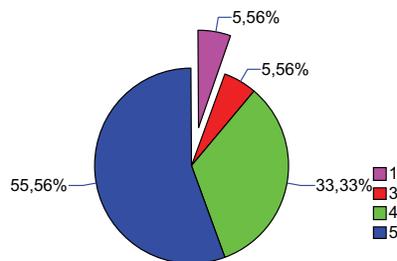
6°) "Group work improves your perception of the subject's contents" yields the following percentages (fig. 14).



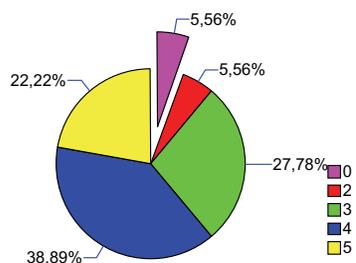
7º) "Group work encourages the debate on subject-related topics" yields the following percentages (fig. 15).



8º) "The resources used by the teacher have been innovative as compared to other subjects" yields the following percentages (fig. 16).



9º) "Using the virtual campus resources for teaching this subject would be a boost" yields the following percentages. (fig. 17).



#### 4. Conclusions

First of all, we should point out that we have always used the traditional method of assessment for the September calls, that is, practice/theory exams assessing the whole subject. That's why we have not included the data thereof when analysing the results of the different subjects.

In general, the changes made to the assessment system of the different subjects have been quite positive, particularly those affecting second-cycle subjects. The virtual classroom featured as a powerful tool from which we can still make the most of as it greatly helped monitoring students' work.

As stated above, we have particularly dwelt on the 07-08 academic results of Competitiveness and Innovation in Business reaching the following conclusions based on the questionnaire results:

- Most students study for professional and personal reasons.
- All students prefer the alternative method of assessment.
- The methodology followed satisfied students and the assessment carried out has encouraged both individual and group work.
- The resources we used are quite innovative as compared to other subjects and students suggest that the subject's content should be included in the virtual campus.
- The degree of satisfaction of the students polled has been medium-high regarding the teaching methodology followed.
- From the pilot experience being carried out, the assessment method followed has been quite satisfactory both from the academic results' and the students' perspectives, taking for granted that the number of students should be kept low.
- Some of the advantages of the teaching methodology followed are the student's positive attitude towards assignments, the student's personal commitment to developing her own "handbook" for the subject, her critical attitude and thought to meet set cases, her initiative to propose new cases, examples and additional bibliography on each topic.

Regarding the trade-offs of this experience, we must point out the need for a more active participation in the lessons and a comprehensive monitoring thereof, as well as the fact that assignments should be submitted in due course.

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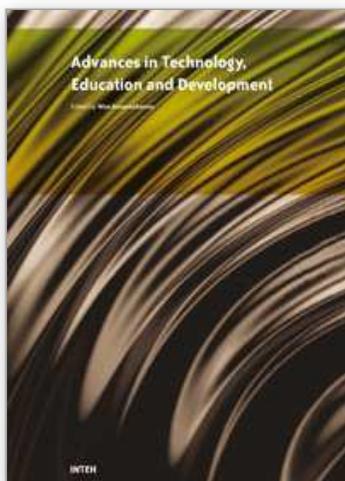
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From 3rd to 5th March 2008 the International Association of Technology, Education and Development organised its International Technology, Education and Development Conference in Valencia, Spain. Over a hundred papers were presented by participants from a great variety of countries. Summarising, this book provides a kaleidoscopic view of work that is done, all over the world in (higher) education, characterised by the key words 'Education' and 'Development'. I wish the reader an enlightening experience.

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