

EDUCATIONAL ISSUES / ASPECTOS EDUCACIONALES

STRATEGIES OF TEACHING-LEARNING FOR THE STUDENTS OF SOCIAL SCIENCES

M. Á. Montero Alonso¹, I. Quesada Vázquez²
Department of Statistic and Operational Research
University of Granada, Spain

ABSTRACT

With the next installation of the European Credits Transfer System (ECTS) and the European Space of Higher Education, the University cannot be limited to treat some contents in the schemas of studies of the subjects that they impart, but rather they must qualify the students to obtain of a series of abilities and competitions, which some of them are specific for each career and some generic or traverse. The students, independently of the different options studied at the high school from where they come, they start their university studies with a great ignorance of the mathematical language, for example, basic notions of statistic, economy or marketing and this hinders the communication among the professor, that cannot transmit the concepts and the student who don't understand them or even worse, they don't learn them. The students show adaptation problem to study matters like Mathematics, Statistic or Economy, that make visible the narrow relationship which exists between this faulty formation and the first academic course, taking place, even in some situations, the abandonment of the university studies. This problem is not only our patrimony, but rather you can generalize to all the Spanish Universities and we are certain that it occupies and worries to the faculty's great sector. To improve the process of the students' teaching-learning we propose a methodology that, as far as possible, helps to place remedy to the learning difficulties and which includes, orientation to the pupil, tutorships' support, and besides, it also offers basic courses that offer them the levels adapted in different matters.

KEY WORDS: Professors, teaching-learning, Courses 0.

MSC: 97U60; 97U70

RESUMEN

Con la próxima implantación del Sistema Europeo de Transferencia de Créditos (ECTS) y la instauración del Espacio Europeo de Educación Superior, los Centros Universitarios no pueden limitarse a tratar unos contenidos en los planes de estudios de las titulaciones que imparten, sino que han de capacitar a los alumnos para la obtención de una serie de habilidades y competencias, tanto específicas de cada carrera como genéricas o transversales. Los alumnos, independientemente de las distintas opciones de bachillerato de las que provengan, acceden a los estudios universitarios con un gran desconocimiento tanto del lenguaje matemático como de nociones básicas de estadística, economía y empresa y esto dificulta la comunicación entre el profesor, que no puede transmitir los conceptos y el alumno, que no los comprende ni aprende. Los estudiantes presentan problemas de adaptación para cursar materias como Matemáticas Empresariales, Estadística Empresarial o Economía, lo que hace que exista una estrecha relación entre esta formación deficiente y el bajo rendimiento académico, produciéndose, incluso, el abandono de los estudios universitarios. Esta problemática no es sólo patrimonio nuestro, sino que se puede generalizar a todas las Universidades españolas y nos consta que ocupa y preocupa a un gran sector del profesorado, así lo avalan la cantidad de propuestas que se están implantando en los distintos Centros Universitarios que si no la soluciona del todo si intenta minimizar los efectos que produce. Para mejorar el proceso de enseñanza-aprendizaje de los alumnos proponemos una metodología que sirva para subsanar, en la medida de lo posible, las dificultades de aprendizaje y que incluye, *orientación al alumnado*,

¹¹ mmontero@ugr.es,

² iquesada@ugr.es

tutorización además de una oferta en cursos básicos que les procuren los niveles adecuados en distintas materias.

1.- INTRODUCTION AND OBJECTIVES

The students that enroll the first time at the University and concretely in our center, University School of Social Sciences³, show problems of adaptation to study matters like Managerial Mathematics, Managerial Statistic and Economy, this makes that a narrow relationship exists between this faulty formation and the first academic course yield in mathematics and matters you tune, taking place, even, the abandonment of the studies (Ortega y Ortega, 2001). In our particular case, to make a good diagnosis of the problems and to be able to give them solution it would be necessary on the one hand to keep in non alone mind the origin of the students of the different options of High school or of Professional Formation, but also another added factor, we have to keep in mind that we have students coming from Morocco who have a lack knowledge of the Spanish language.

On the other hand, the Technologies of the Information and the Communication are facilitating a new form of teaching and of learning that cannot be unaware to the world of the University (Benito y Olvear, 2005). The politics educational university in the Society of the Information and of the Knowledge should stimulate the relationship between the professors and the students to improve the quality and efficiency of the teaching process (MECD, 2006).

We consider that in our Center still exists a deficit in the use of the TIC, this is the departure premise, a premise that we want to improve and therefore we must continue with the challenge of fomenting their use that was initiated with projects carried out in previous courses. For example by means of the creation of a work group for the teaching process, with the concurrence of some subjects belonging to the qualifications that are imparted in this University Center. This idea constitutes a support to the present teaching and the laboratory practice, also facilitating a work coordinated among the professors, a pursuit of the learning process, the continuous evaluation, the tutorship and the students' advice. This teaching has been implemented making use of a computer application, of free distribution in the university environments, which allows to share documents and projects, to carry out debates, to create forums, to agree a work calendar, etc., so by being always perseverant, it facilitates the pursuit and the continuous evaluation.

The binomial teaching - learning must prevail in the university teaching, it is crucial therefore that the student can be integrated in the university with the trust of getting help and the feeling of being leaning (Batanero, 2002b). With the purpose of improving the process of the students' adaptation and the quality of the teaching we have thought and carried out this project that, to our to understanding, it is good that the learning difficulties and the lacks of knowledge are corrected, as far as possible, offering that students acquire some appropriate levels that allow them to be integrated in the elected qualification with a bigger security.

The Project of Educational Innovation: A solution to overcome the difficulties of the learning and the formative lacks of the students of Social Sciences, dedicated to the students preferably 1st year of entrance, consisting on providing an offer in courses of basic formation of different areas that allow to acquire the knowledge and help to the learning. These are the courses offered:

1. Course of study habits and technical of learning.
2. I study basic of Mathematics. (Course 0 in Mathematics).
3. Course of Introduction to the Statistic. (Course 0 in Statistic).
4. I study basic of Company. (Course 0 in Economic).
5. Course of Office.
6. Course of Spanish Language.

The objectives that are pursued are (Dirección General de Ordenación Educativa y Formación Profesional, 1997):

1. To incorporate the philosophy of the European Space of Superior Education putting special interest in the student's learning and to increase the quality of the teaching in the Center.

³ From the course 2010/2011 Faculty of Social Sciences

2. To improve the inadequate formation of the new students so that they can approach with fluency to the subjects of their qualification (mathematics, statistic, economy and company...).
3. To offer to the foreign students, to those coming from Morocco and to those that come from other countries (LLP-Erasmus) bigger and better knowledge of Spanish's.
4. To provide to the students information about habits and technical of study in order to facilitate a clear way their learning channelling so that they see changes in their effort and work.
5. To facilitate them the handling of necessary computer programs for their qualification.
6. To stimulate the students designing an attractive program that not only it offers formation but it rather foments the personal work, in teams and it ameliorates the tutorships with the professors.
7. To clarify theoretical concepts and to apply them to the practice in real situations.
8. To avoid the rigidity of the acquired mathematical formation, learning how to represent functions graphically, to relate variables, to interpret and to model in real cases of application to the Social Sciences in general, to acquire the abilities and dexterities which were lacked.
9. To motivate the students to learn statistic, mathematics, economy and computer science and to sensitize them about the importance of the statistic, their applications and interpretations in the Economic's land.
10. To improve the academic results, diminishing the index of failure and the rate of abandonment of the university studies.

Parallel to this, the Project of Innovation in Tutorships called Vicienso: your virtual tutor offers new tools that facilitates the autolearning that the students will have to use in their future professional activity, so this project have to seek to deepen in the relationships among the students and between this same one and the teachers by means of the tutorships, the forums and with it, they help to the approach from our centre to the educational innovation and upgrade in teaching-learning methodologies.

Also, with this project, are trying to give continuity to the action of tutorial with our students, since these had other projects of welcoming for the students when their university studies began, but a continuity of this tutorial action didn't exist, for what we considered that it was indispensable to already follow this work begun with other partners and not to abandon the tutorship and the advice (Quesada, Montero y Marmolejo, 2008).

Therefore, the objectives that are pursued with this project of tutorial action are (Álvarez y Bisquerra, 1996):

1. To continue with this new communication road between professor and student using the benefits of the new technologies, fomenting and upgrading this way a new teaching methodology, looking for the flexibility and the personal freedom to carry out the action tutorial.
2. To try to demonstrate the improvement that takes place in the process of teaching-learning of the different matters using the new technologies and upgrading the roads of communication professor-student of those that prepare.
3. To help and tutorship the students in the design of their curricula, to give itineraries that interest them, given there are diversity of optional subjects and of free configuration which prepare them. And also the lack of formation is going to determine where their professional and formative interests are.
4. To foment the interest and the participation of the students in this methodology with the use of new available tools and incorporating them progressively in their study habit, obtaining this way a better training and upgrade.
5. Creation of a new communication road that will be able to be used by other students in the following years. Also, this initiative seeks to foment the employment of the TIC in educational activities at distance putting into practice new instruments with a view to favour a change in the used methodology keeping in mind the new educational necessities that think about with the EEES.
6. To deep in the familiarizing of the students with the tutorships and in the approach of our centre to innovation programs and upgrade in teaching-learning methodologies.

7. To offer the students a personalized advice, in the context of an individual tutorship of accompaniment and support.

2.- MATERIAL AND METHODS

The traditional means of the education at distance are passive and they provide a minimum interaction between students and professors and among the own students (Batanero, 2002a), (Sandaló, 1998), so that they have had to create support nets and tutorships for the students in order to palliate the isolation sensation, opening steps to new didactic strategies, as the collaborative learning, based on the communication among people in a rich information environment and to new educational lists. In the virtual teaching the professor acts as facilitator of the learning more than dispenser of knowledge (the professor's traditional list) directly or by means of the materials (in the education at traditional distance) (Montero, Roldán, Marmolejo y Fuentes, 2008).

The material aspect consisted on the elaboration of the specific programs of each matter on the part of the taken charge professors, the preparation of the different questionnaires that spent to the students, that of entrance and that of exit, the realization of interviews and of a test of knowledge, with the purpose of to detect lacks and to check the level that the students present to focus the programming of the different courses. All the courses have been tutorship in a virtual way, (CEVUG, 2003).

They have been designed and published triptychs and posters to inform and to diffuse the project again among the students entrance. Necessary computer material was acquired for the elaboration of the courses. It was designed a web page like support to the teaching and the tutorships and they surrendered pen drives with the different contents.

To carry out the virtual tutorships the program Skype has been used, very used doesn't only enter young but between multitude of companies and institutions for this end. The interface of Skype is very similar to another such software of instantaneous messaging as MSN Messenger or Yahoo! Messenger, and the same as in these, it is possible to begin a conversation of instantaneous messages or to carry out a videoconference with the users of the same software, so that each user can be discharged the application of the official place gratuitously and to speak among them.

Naturally, Skype has not only been used to carry out the action tutorial in a virtual way, but is the most habitual, so the electronic mail have also been used. As has been said previously, it was created a virtual platform that serves from reference to students and where this can find material of their utility, as the one generated in the different subjects. It has been used, also, a forum and a blog, that have facilitated that the students ask and debate on questions that they interest them or on those that doubt and that they have been solved and clarified among them or with the help of the professors. On the other hand, were recorded videos of the different activities carried out in the Center, masterful classes and conferences imparted by specialists in different matters, professors coming from our own University or of other University that have visited us during the academic course. These videos have been hung in the platform so that the students can see them or to discharge them when they want.

Therefore, the realization of this project combined need of a good organization, since many specifies areas and the collaboration of professors of different departments, therefore we can consider a plan wide and ambitious.

The group of professors implied in the project has worked and continue working in team in order to fix the general lines of performance, evaluation and all the concerning to the development of the same one, for get a homogeneous methodology that rotated and rotates around the students learning, (Quesada y Montero, 2009).

The methodology to continue the realization of the courses has given the following guidelines considered important to apply and that also appear in the guide of auto evaluations of the Andalusian Plan of Quality. In short, the aspects of the educational methodology, the student's work and the evaluation of the learning were structured in the following way:

1. In the first place surveys have been carried out to the professors for know their opinion on the setting in practices of PID, asking aspects related with the previous points, keeping in mind that this educational project looked for correcting some of the deficiencies that appear in the auto

evaluations reports that was carried out in the three degree which are imparted in the University School of Social Sciences⁴.

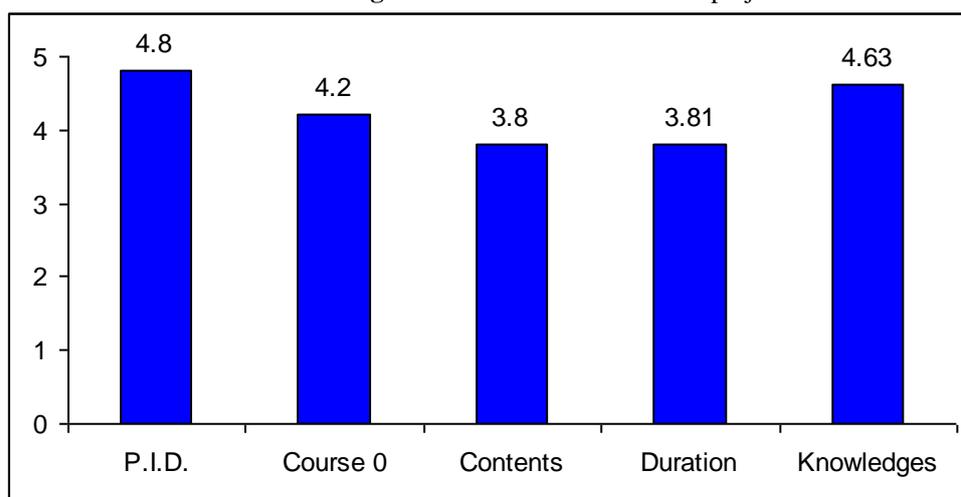
2. In second place we carries out a questionnaire and one interviewed to the students with the objective of having some data of interest and giving to know the project. Next, an initial test of basic knowledge was made where were presented a battery of questions about different questions in order to detect their formative level.
3. A intense learning program was developed by means of:
 - To introduce sessions of eminently practical character, with a brief theoretical introduction of the topics, followed by realization of exercises.
 - Not to show activities where the student carry out his individual work.
 - Tutorships for guide, advice and help the student.
 - The students evaluation were made by means of attendance control and works.
4. A web page has been created where students can find information with respect to the courses, videos of activities carried out in the center, a forum and a blog.
5. Also, the students that carry out and overcame the courses have obtained credits of free configuration.
6. At the end of course we spend a questionnaire of satisfaction.

3. RESULTS AND DISCUSSION

For the evaluation of the acquisition of competitions, the increment was measured in the level of knowledge by means of entrance test and exit test. This project is taken carrying out two courses, where the first year 25 students participated and the second year 38 students they participated, and in it has been studied the influence of the project has been studied in the decrease of the rate of abandonment making a comparative study with previous years, the satisfaction of the students and the convenience of continuing with the project. The project is evaluated when concluding each academic course, including the possible improvements for the next course.

On the other hand, we have made students to participate of the address of the University School so that in an objective way, they will express the convenience and contribution from this project to the Center, to the professors and students.

Figure 1. Global valuation of the project.



For the students (Figure 1), they have manifested that in 85% which the contents of the courses 0 has contributed to clarify and to reinforce the learned and even to learn and to understand concepts and

⁴ Since course 2010/2011 the new grades have been implanted in the Faculty of Social Sciences.

Finally the results will be exposed where it will be able to be proved the grade of satisfaction of the activity carried out.

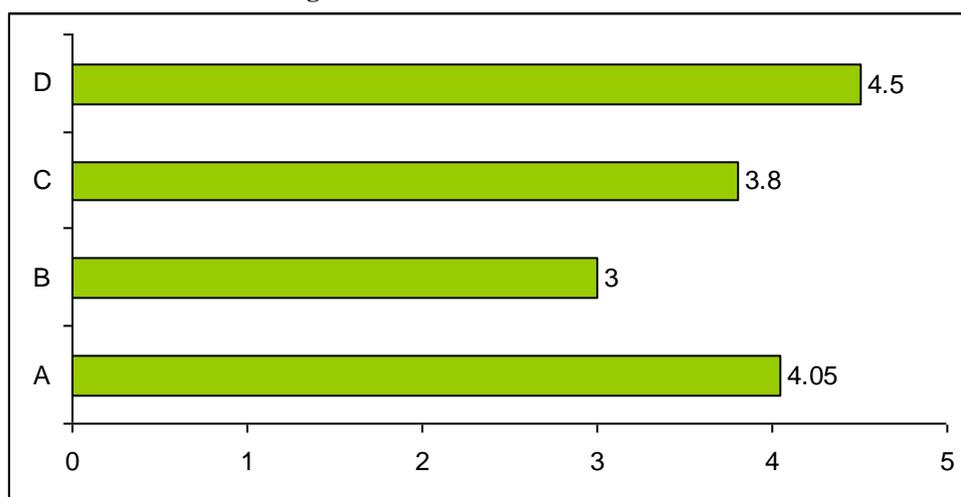
For the internal evaluation a questionnaire of satisfaction that provides us information about the kindness of the combined project, the courses, the contents, the time, and other aspects related with the methodology and the learning take place. This contained 36 questions and scales from 1 to 5 that were used to evaluate or even better, to control the nominal variables that we wanted to study. First, students five questions that provided information about the global project were answered and then they answered questions that made reference to each courses in particular, tutorships and the elaborated material. Lastly, open questions where we request the student that add any consideration, improvements that they could be useful to improve the project.

In general, the students have considered interesting this experience, mainly because any effort that is made in to synthesize matters and to facilitate the learning of the subjects using the TIC is always very welcomed by the youngest generations. In turn for some professors of the project think the experience is very satisfactory, even arriving to improvement its educational work when using this platform problems that before never understood. In general, the Courses 0 were evaluated very positively and most requested a bigger duration for some of them.

For the evaluation (Figure 2 and 3), the students were asked different questions of the Courses 0. They were asked about the following questions:

- A) Valuation of the Course 0,
- B) Do you believe that should have more courses?,
- C) Do you find interesting and useful?,
- D) Valuation of the professor in each course?

Figure 2. Valuation of the Course O in Mathematics.



All the participants (professors and students) have valued very positively this project and all recognize the improvement that takes place in the students. The tools are considered easy of using and very intuitive.

The professors that have participated have valued very well that they could adapt the options multiple of configuration of the virtual work spaces and that could apply them in the lessons with students of all the levels. In turn, students value the collaborative work developed as an alternative of useful formation and which promote significant learnings. Most of the participants contributed with new ideas of possible application in their respective areas, some of those which are already experiencing.

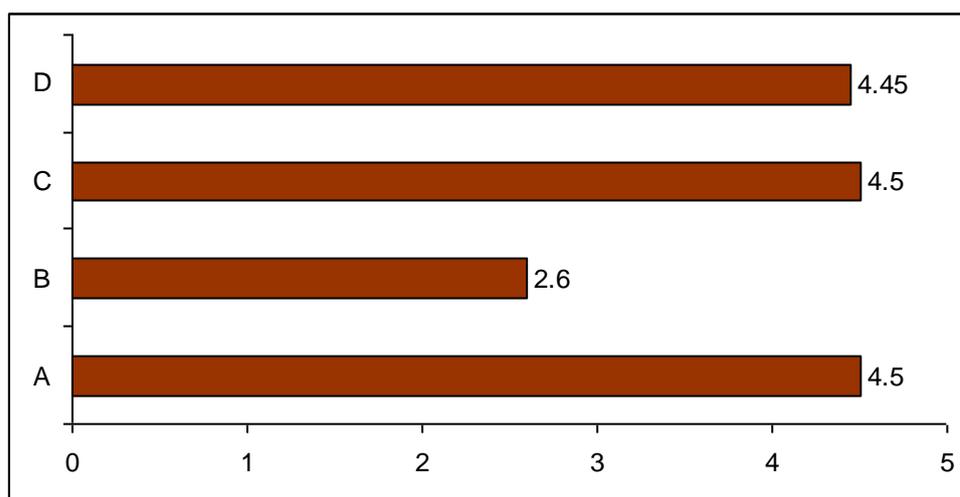
The students that have collaborated in the experience have used, with certain success and in very little time, a tool that was absolutely unknown and have done all works without paper for the delivery of activities of the classroom, using just a digital format.

Besides the previously mentioned results, a database has been created with the addresses of the students' electronic mail that are registered in the University School of Social Sciences. This has allowed us to transmit different information of interest or news of relevance, in a quick, easy and effective way, as well as diverse material, videos, presentations in power-point and in flash that have been of utility for students and even for professors.

A platform has been created from the web page of the University School of Social Sciences so that the students surf on it and they can find necessary information. Its address is <http://eues.ugr.es/vicienso/>.

Although we find important all questions that has been mentioned previously, the professors that have begun and concluded this project believe that the obtained primordial result is that, in our Center, everybody knows Vicienso, but not knew as "the Italian Erasmus student", but knew as your virtual tutor, only with the first year of life. It is not less important that the number of professors that have participated in the continuation of the project reaches approximately to 50% of the faculty of the University. Also, the students that participated in this PID, in Vicienso, in the following course have been the new partners' tutors, involving to a bigger number of people.

Figure 3. Valuation of the Course O in Office.



4. CONCLUSIONS

We know that in the European Space of Superior Education the subjects that conform the plan of studies of a qualification cannot be limited to the mere exhibition of some contents and the teaching of some processes, but it is rather necessary a learning that endows the students of a series of competitions, abilities and dexterities.

The high number of flunks and the little interest that it showed by the students made us reflect in order to stimulate them and to motivate them in the importance that mathematics statistic and computer science have in the current world and in the world of economy and company (Antomil y otros, 2001).

This led us to design during the two previous courses and the current one a series of Projects with a largest time offer that allowed us advance and help and even, guide the students facilitating the learning process, articulating the dialogue and also favoring the participation and incorporating the new technologies.

For grant the student a bigger protagonism in the teaching-learning process and to get acquire generic and specific competitions, part of the traditional tutorships have been substituted by virtual tutorships. This revolution together with the constant evolution of the new technologies and the new necessities that these contexts outline have contributed - in great measure - to the emergence of new models where converges the present and the virtual at distance, and where they combine spaces (traditional and virtual classes), times (present and not present), resources (analogical and digital), and where the main characters modify their lists in the teaching-learning processes (Montero y Quesada, 2007). Also, the changes also affect, in an unavoidable way, to the organizational models, more concretely, we are referring to the formation models Blended Learning (B-Learning), semi actual, hybrid, or mixed, in any of their denominations.

From our point of view, these strategies suppose an increase in the quality of the teaching because the students will be able to approach the subjects mentioned previously with a bigger fluency. It also supposes for the students a bigger approach to the faculty and a better knowledge of the philosophy that underlies with the creation of the European Space of Superior Education, where the tutor's figure acquires a special relevance, as responsible for the formation that is carried out. The tutor is the nexus among the formative environment, the contents and the student (each one of them with formative necessities, restlessness and the different styles of learning). The tutor is the element that endows from dynamism

and vitality to the own methodology, and it is, ultimately who can transform the technology and the contents, in a formative solution of quality. In fact, the success of the technology to the service of the formation doesn't depend on the technology but on people (Montero, Quesada, Roldán y Marmolejo, 2008).

In definitive, we think that the problem of faulty preparation should be during the previous studies to the university studies (Gascón, 1997) and we are aware of the limited character of our projects, but with them we seek to facilitate the construction of the knowledge of our students, to have a bigger control on the contents and the activities, possibility of collaborative work as for students as professors and that these take the responsibility of its own learning. As tutor, the objective is to be modernized, to energize and to make accomplices to all the agents that participate in the teaching-learning process, using the current means in front of those old means that are demonstrated that don't contribute to improve the teaching of the basic and important concepts of each matter (Corcho y Corcho, 2002).

**RECEIVED APRIL, 2010.
REVISED JULY, 2010**

REFERENCES

- [1] ÁLVAREZ, M. y BISQUERRA, R. (1996): **Manual de orientación y tutoría**. Praxis, Barcelona.
- [2] ANATOMIL, J. y otros (2001): Matemáticas en los estudios de Economía y Gestión de Empresas ¿por qué?, ¿cuáles?, ¿son posibles?. **Acta de IX Jornada de ASEPUMA**.
- [3] BATANERO C. (2002a): Estadística y didáctica de la matemática: relaciones, problemas y aportaciones mutuas. En C. Penalva, G. Torregrosa y J. Valls (Eds.), **Aportaciones de la didáctica de la matemática a diferentes perfiles profesionales**, 95-120. Universidad de Alicante.
- [4] BATANERO C. (2002b): Los retos de la cultura estadística. **Jornadas Interamericanas de Enseñanza de la Estadística**. Buenos Aires. Conferencia inaugural.
- [5] BENITO, M. y OVELAR, R. (2005). Impacto de las TIC y del proceso de convergencia al EEES en el profesorado universitario. Disponible en:
http://pulsar/ehu.es/pulsar/documentacion/informes_pulsar/IInforme_PULSAR_Diciembre.pdf
- [6] CEVUG (2003): Guía para la generación de contenidos educativos, de tutores, de evaluación y de estudio en entornos virtuales. CEVUG, Granada. Disponible en <http://cevug.ugr.es/web-cevug/materiales.html>
- [7] CORCHO SÁNCHEZ, P.I. y CORCHO SÁNCHEZ, P. (2002): Como motivar la asignatura de matemáticas en las carreras de Ciencias Sociales. **Revista SUMA**. Ice de la Universidad d Zaragoza, 410.
- [8] DIRECCIÓN GENERAL DE ORDENACIÓN EDUCATIVA Y FORMACIÓN PROFESIONAL (1994): **La atención educativa de la diversidad de los alumnos en el nuevo modelo educativo**. Sevilla: Servicio de Publicaciones de la Junta de Andalucía.
- [10] GASCÓN, J. (1997): Cambios en el contrato didáctico: el paso de estudiar matemáticas en la secundaria a estudiar matemáticas en la Universidad. **Revista SUMA**. Ice de Zaragoza, 26.
- [11] MECD (2006): **Propuestas para la Renovación de las Metodologías Educativas en la Universidad**. Madrid: SGT.

- [12] MONTERO, M.A.y QUESADA, I. (2007): Enseñar Estadística bajo un entorno Virtual. In: **XXX Congreso Nacional de Estadística e Investigación Operativa**, Valladolid, España.
- [13] M. Á.; QUESADA, I.; ROLDÁN, J. A. y MARMOLEJO, J. A. (2008): Evaluation of materials and teaching methodology under a virtual environment for statistic subjects adapted to the future European Higher Education Space. In: **Premier Colloque Francophone International sur l'Enseignement de la Statistique**. Lyon, Francia
- [14] MONTERO, M.A., ROLDÁN, J.A., MARMOLEJO, J.A. y FUENTES, A.M. (2008): New tendencies in the Teaching and the Learning in Statistic. In: **8th International Conference on Operations Research**, Havana, Cuba.
- [15] ORTEGA, J. F. y ORTEGA, J.A. (2001): Matemáticas: ¿Un problema de lenguaje? **Actas IX Jornadas de ASEPUMA**.
- [16] QUESADA, I.; MONTERO, M. Á. y MARMOLEJO, J. A. (2008): How to motivate students to study statistic in order them not to abandon. In: **Premier Colloque Francophone International sur l'Enseignement de la Statistique**. Lyon, Francia
- [17] QUESADA, I. y MONTERO, M. Á. (2009): Nuevas metodologías en la didáctica de la Estadística para los alumnos de Ciencias Sociales. En: **XXXI Congreso Nacional de Estadística e Investigación Operativa**, Murcia, España
- [18] SANTALÓ, L. (1998). Estadística y Probabilidad en la Escuela Media. **Elementos de Matemáticas**, II, 7, 16-26.