Learning Econometrics by doing Econometrics. Some pilot experiences

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The role of Econometrics in the European Higher Education Area

More than seventy years ago Joseph Schumpeter published his famous work "The common sense in Econometrics", where he claimed that every economist is an econometrician since data should be used as a complement of economic theories.

Since then the role of Econometrics in Economics and Business degrees has gradually increased including not only the study of the main techniques for the estimation and testing of econometric models but also a more realistic approach, which is often based in the use of econometric software.

This more practically-oriented study has become especially important in the present context, since European Universities are currently facing the challenges of the so called "Bologna process"[1] which aims to increase the mobility and employability of European higher education graduates thus ensuring competitiveness of European higher education on the world scale.

The European dimension of education and the contribution of education in setting the European Information and Knowledge society have been stressed in the Lisbon Summit (2000) with the strategic goal of "*making out of the European Union the world´s most competitive and dynamic knowledge-based economy, capable of sustainable economic growth and with more and better jobs and greater social cohesion*".

Education, research and innovation are the main factors to achieve the Lisbon objectives, and therefore several initiatives have been launched at European, national and institutional levels.

In the case of Spanish universities, the Bologna process has to face several difficulties since the

[1] The Bologna declaration was signed in 1999 by the ministers of education from 29 European countries, with the aim to develop the European higher education area (EHEA) by making academic degree standards and quality assurance standards more comparable and compatible throughout Europe. Since then and after several governmental meetings [Prague (2001), Berlin (2003), Bergen (2005), London (2007)] this process has further developed into a major reform encompassing 45 countries.

structure of university degrees in Spain is quite different from the Anglo-Saxon model adopted as a reference[2].

In this new context Econometrics are expected to play an instrumental role in Economics and Business degrees. Although the available information in quite scarce, according to the provisional guidelines these studies should train individuals capable of analyzing and interpreting the functioning of the economy, with the intention of improving the well-being of the society with the achievement of equity and efficiency and in general to approach the analysis of the most relevant economic and social problems.

More specifically, these degrees should provide skills as “to use analytical instruments in the decision-making processes" or "to handle information technologies”, aspects in which Econometrics can play an outstanding role.

Some pilot experiences

In the previously described framework we have developed some pilot experiences referred to the teaching and learning of Econometrics at the University of Oviedo. Adopting a “learning by doing” approach and following the main guidelines of the Bologna process, during the last three courses we have gradually implemented a more realistic methodology, characterized by an intensive use of e-learning and a continuous evaluation.

The generic and specific skills of Econometrics are summarized in table 1.

Table 1: Generic and Specific Skills for Econometrics

Generic Skills	Specific Skills
- Analysis and Synthesis Capacity - Implementing theory to practice - Problem Solving - Team work - Software use - Critical Capacity - Oral and Written Communication - Decision Making	- Developing econometric models including the search of information, estimation, testing and forecasting - Interpreting the components of an econometric model - Understanding significance tests - Detecting, testing and solving the main problems related to the violation of hypotheses - Obtaining economic forecasts - Using software and interpreting the obtained outputs

Referring to the generic skills, it is necessary to adapt the students´ knowledge and capacities to the labour market requirements, trying to attenuate the traditional existing distance between the perceptions of academics, employers and graduates. In this regard, the project Tuning Educational Structures in Europe detects significant differences in the arrangement of skills realized by these three groups, leading to Pearson correlation coefficients under 60%.

[2] The Spanish system has two kinds of initial degrees, respectively leading to a medium-level technical profession (three year *Diplomatura* degrees) and to higher-level professions or academic disciplines (four or five year *Licenciatura* or *Ingeniería* degrees). Although the *Diplomatura* degrees used to be a sort of blocked path, over the years the possibility was opened to go on to the last two years of a *Licenciatura* in a related but different field. But a *Diplomatura* has never been the exact equivalent of a BA/BSc, nor the *Licenciatura* that of a MA/MSC. The new degrees have started for the master’s level in 2006, and are scheduled to start at the undergraduate level in 2008.

Facts and Figures

The experiences we are summarizing in this work, in spite of his experimental character, have allowed us to adapt the Econometrics teaching to this new context and to collect students´ opinions about the most new aspects: the skill-based learning and the European credit transfer system (ECTS).

Since Information and Communication Technologies (ICT) can be a strategic tool in this process, we have emphasized the use of e-Learning which, according to the European Commission, must be understood as "the use of new multimedia technologies and the Internet to improve the quality of learning". In fact, the virtual campus AulaNet provides a wide variety of resources including multimedia facilities, mail, forum, chat, self-assessments, … which have been proved to be very useful in order to improve the communication between students, to develop the team work and to evaluate students´ knowledge.

Besides, AulaNet allows the implementation of on-line questionnaires in order to obtain information from students about their personal effort, the perceived difficulty of the educational contents and the acquired competitions and skills. A scheme of this survey is shown in table 2.

Table 2: On-line Econometrics survey

Sections	Qualitative aspects	Quantitative aspects
Personal work	Hours of study	Perceived difficulty for each item
Team Work	Hours for the database, estimation, testing, exposition, final report, …)	Perceived difficulty for the team work Comparison of personal and team effort Quality of the team work compared with the others
Assessment		Perceived difficulty of assessment questions Level of satisfaction with the assessment system
General vision		Level of satisfaction with the subject Opinion about professional skills Comments and suggestions

Although the rate of response was quite low (50%), the obtained information shows some interesting facts. A first consideration is the heterogeneity of students, reflected in the high dispersion of times of personal work, leading to two consequences: the estimated average times of study do not turn out to be representative and the existing heterogeneity should be considered when designing and implementing the learning methodology.

On the other side a considerable homogeneity is found in the perceived levels of difficulty and also in opinions about the evaluation criteria, which turn out to be very favorable (70% of the answers are positive or very positive). Besides, since these experiences have been carried out along three academic courses we have also tested the stability of the obtained results.

Regarding students´ opinions about learned skills, they mainly emphasize the aptitude to solve problems and to use econometric software and they also appreciate the team work as an interesting (although rather hard) experience.

The application of the described methodology and the system of continuous assessment has improved the academic indicators as showed in table 3.

Table 3: Econometrics academic results

	2003-04	2004-05	2005-06	2006-07
Proportion of presented students (%)	72%	77%	68%	73%
Rate of Success (Proportion of approved students, %)	72%	77%	80%	80%

To conclude, since we find that this kind of experiences could help us to improve the quality of learning and we think that co-operating networks should be emphasized in the framework of the European Higher education Area, we are now trying to develop a European virtual network in Statistics and Econometrics.

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RÉSUMÉ (ABSTRACT)

Apprenant Econométrie en faisant Econometrie. Quelques experiences pilotes

L'apprentissage et l'enseignement d'Économétrie a éprouvé des changements substantiels dûs à la disponibilité croissante d'information et de programmes informatiques. L'emphase se met actuellement dans la pratique d'économétrie et essayant d'adapter les connaissances des étudiants aux conditions requises du marché de travail.

Ce procédé doit continuer dans les années prochaines puisque nous faisons maintenant face au "procédé de Bologne" qui vise à développer les études supérieures européen en faiant les normes d'universitaire et qualité plus comparable et compatible à travers Europe

La convergence d'études supérieures porte des défis importants pour les systèmes d'université éducatifs, se fixant principalement sur l'étudiant, concevant un enseignement basé sur des compétences et en introduisant le crédit ECTS comme l'unité académique qui estime le travail total développé par les étudiants.

Dans ce travail nous présentons quelques expériences pilotes réferées à l'enseignement et apprentissage d'Econométrie dans l'Université de Oviedo. En adoptant la philosophie de "apprendre en faisant" et en suivant les directrices principales du procédé de Bologna nous avons mis en application une méthodologie plus réaliste, caractérisée par un usage intensif de e- learning et l'évaluation continuelle.

Nous résumons aussi les opinions des étudiants, reprises à travers d'une enquête en ligne et rapportées à son travail personnel, la difficulté perçue de la matière et le niveau de satisfaction avec les compétences acquises.