



An open debate on the future of quality university education in informatics

Universitat Politècnica de Catalunya

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Good morning everybody, first of all, I would like to thank all attendants for your effort in coming to this event.

The goal of this event is to contribute to a debate on the future trends of higher education, and in particular, in the framework of teaching Informatics at University level. In my brief exposition I will address some topics to stir the posterior debate which should be the most important ingredient of today's event and will let it to the invited speakers to further elaborate at their convenience.

Many professors at the Department of LSI are a bit puzzled by the trend the teaching of the engineering in the area of Information Technologies is taking. It seems that these studies are focusing more and more in training technicians, towards an option of low-level job market, at the expense of reducing to a minimum the subjects with scientific character.

The dictionary defines engineering as the *application of scientific and mathematical principles to achieve the design, manufacture, and operation of efficient and economical structures, machines, processes and systems*. In the Spanish state, some of the engi-

neering degrees with more tradition are adapting the contents of their courses, but still keeping the scientific nature of the studies: they do not teach how to use a technique but why to use the technique and the scientific foundations of the technique.

On the other hand, some of the youngest disciplines, as informatics, seem to go further and further away from using the rigor of the scientific method as the way to transmit knowledge in the classrooms. I will give a simple example: probably all students of informatics at the UPC, learn the social, economical and technological consequences of using web search engines, but very few students know how a web search engine works. Moreover, the students are not exposed to the basic mathematical tools needed to understand the functionality of the web search engines. I suspect that it would be difficult to find an equivalent example within the most classical engineering studies such as civil engineering or mechanical engineering.

Some political and social agents in the Spanish society seem to be only concerned by the students' failure rates and by the immediate applicability of what is being taught at university, rather than by the quality of the education provided. As a consequence, they demand public universities to concentrate on training technicians, eliminating from the curricula anything which may require a certain degree of students' effort and whose immediate applicability is unclear. From my point of view, if that must be the main goal in undergrad teaching, then universities are over funded with public money. To train a that type of technician in informatics you do not need 4 years of university (unless you wish to cover up the statistics for national unemployment)
You do not need professors giving between 4 and 8 hours of lectures per week and engaging in research and technology transfer.

Unfortunately, in today University a significant part of the professors do little or no research at all. It takes less than 5 minutes of yahooping to see the scientific and technical contributions of any given person.

An important consequence of this situation is the widening gap between some professors that strongly advocate for scientifically sound education, versus a large number of students and some professors that believe that the University should merely do a professional technical training, prioritizing the number of passing students versus the quality of knowledge. This polemic has affected the university, in particular the schools associated with the field of information technology.

Today, many research-oriented professors are looking for research alternatives in institutions loosely associated with the university but, de facto, this is drawing them away from daily university life. This personal option is easy to understand for most of the people who know the university bureaucracy associated with tasks as hiring young researchers, and the *quid pro quo* manners of the big important decisions in many universities in this country.

These facts are causing the effect of driving away from the university management some of the best professionals. I am not convinced this is totally good for the future of Universities and it may point into the direction of transforming the university in a school for technicians and keep the research at a different level. After all, to train technicians, professors do not need to have any level of research activity.

An alternative that is being proposed by some academic members is the coexistence of the two types of education: the massive technician training together with a minority getting a more scientific education. From my point of view, this is not going to work unless both styles of education are going to be very clearly separated, in particular, by the title of the awarded degree. In fact, the quality of the studies depends very clearly on the quality of the students, and today it is easy for good students to go abroad to good universities.

Having prestigious studies is a necessary condition for having good students. In general, good students look for the indicator of the international prestige of the professors and the degree being awarded. To obtain that prestige, a significant effort by students and professors is required, in particular the mechanisms of selection and promotion of professors must be totally based on professional considerations and striped of any other considerations that often are used at the Spanish University.

For a further example on the situation, I would recommend everybody to look at the compulsory guidelines that the Spanish Ministry of Education has produce for the studies of Informatics in Spain in the next decade, and which regulate what should be learned in informatics in Spain. When I read it, a sentence that Francesc de Carreras, Professor of Law at the U. Barcelona, wrote one month ago in La Vanguardia, in an article about the future of university came to my mind: *"la reforma actual de los nuevos planes de estudio de grado, han sido mayoritariamente aprobados sin apenas discusión de fondo sobre el contenido de las materias que enseñar y repartiéndose los profesores las asignaturas que impartir mediante un oscuro trueque de inconfesables intereses"*

To sum up, my questions to the speakers: Quo vadis Universitas?, in Spain and Catalunya it is necessary a rigorous scientific education in informatics? Are other universities in Europe experimenting similar problems?

To debate about these issues, we have today with us:

Andreu Mas-Colell Professor at Pompeu Fabra University and President of the Barcelona Graduate School of Economics. Former Minister for Universities, Research and Information Society of the Catalan Government and present General Secretary of the European Research Center.

Ricardo Baeza-Yates: Vicepresident of Yahoo! Research for Europe and Latin America and Director of Yahoo! Research Labs Barcelona and Santiago de Chile. ICREA professor at Pompeu Fabra University.

Josep Casanovas ViceChancellor for University Policies, Technical University of Catalonia and former Dean of the Barcelona School of Informatics.

Carlos Domingo, Director of Telefónica I + D de Barcelona

Manuel Hermenegildo: Prince of Asturias Endowed Chair in Information Science and Technology, University of New Mexico. Professor at Universidad Politecnica de Madrid and Director IMDEA (Madrid Institute for Advanced Studies in Software Development Technologies)

José Rolim: Professor at Universitat of Geneva, Director of the Centre Universitari d'Informatique (CUI).

Jan van Leeuwen: Computer Science professor and Director of the Information and Computer Science Department, Utrecht University. Present Vicepresident and former president of "Informatics Europe", the European Association of Informatics Schools.