

# Activities of Euro-CASE Platform on Engineering Education from the Viewpoint of the Engineering Academy of the Czech Republic

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## Summary

Within the scope of Knowledge society which is a base for the present economic and social development of the society it is necessary, among others, to deal with the issue of education. Its substantial and inseparable constituent is the field of engineering education. In order to be able to override the present crisis and to foster successful development of the economy we need well-trained engineers.

However the interest of young people in engineering education does not correspond with the requirements in this field and also support from the state administration and the EU as a whole is quite insufficient.

This contribution deals with the attitude of the Euro-CASE Platform "Engineering Education" to the above issue highlighting the situation in the Czech Republic.

## Abstract

For further growth of the economy we need well-trained engineers and at present they are already a very scarce commodity. In today's globalized world the issue of well-trained engineers is no more a national issue but a European one and without hesitation it can be said that it is a global one. Sustainable development without well-trained engineers is absolutely unthinkable. And this is why one of the main tasks of engineering academies is to participate in the issue of engineering education. Euro-CASE developed a special interest in this issue. Consequently a Platform devoted to this theme was created in 2005.

The main topics of the Platform are :

- Initiatives to enhance the motivation of young people towards science and technology issues and to attract them to corresponding studies.
- Initiatives to foster an innovative attitude of students and to introduce an innovation structure in educational institutions.
- Identification of key factors of excellence in engineering education in knowledge communities. The role of existing institutions.
- The Euro-CASE Engineering Education Platform also shows interest in the contribution to an evaluation of the Bologna process particularly in the fields of mobility of students and transparency of degrees and accountability.
- Ranking in Engineering Sciences
- Standardization of technical education in the EU.

The Platform carried out analyses and elaborated final reports concerning the issues "Bologna Process" and "Ranking in Engineering Sciences"

When evaluating the Bologna Process the Platform arrived at conclusions that :

The Core Group remains sceptical towards the Bologna Process. The Europe-wide standardisation of national higher educational systems is not necessarily a value in itself. The establishment of comparable degrees across Europe seems to make sense only vis-a-vis an economic view. The improved flexibility and transparency is furthermore put into question.

Still, the process cannot be shaped on an European level, but must be influenced on a national level. In order to get involved in the process, the academies should contact the responsible persons for the Bologna process at their national government. Also concerning the improvement of mobility, the obstacles need to be overcome nationally or even from university to university, for example through bilateral arrangements between universities and exchange programmes, such as ERASMUS, International Student Exchange Program (ISEP), Central European Exchange Program For University Studies (CEEPUS), Double Degree Programmes with other universities, Summer Programmes or National Exchange Programmes or scholarships and the terminating ERASMUS programme.

In the analyses concerning Ranking in Engineering Sciences :

The Core Group is aware of the importance of ranking for the European higher education system. Nevertheless, it is difficult to compare different higher Education Systems and different environments of national Education Systems. Especially concerning Engineering Sciences.

One of the main questions concerning ranking in Engineering Sciences is the choice of criteria. The quality of research in engineering sciences cannot be measured by the quantity or the density of citation alone. The choice of the right criteria is very controversial: "Innovation" seems to be as important for measuring excellence as the quality of "research". The number of publications and citations seems to be less crucial than for example the number of start-ups, of patents or the financial volume.

Furthermore, it has to be taken into account that the different educational systems rely on different priorities in education systems. The research on the link between education, motivational structure and socio-cultural context is still missing on an international scale. In this context, it needs to be discussed whether Europe needs one paradigm of excellence in technical science. It can be argued that the diversity of excellent science institutions is important as the unique selling point of the European education system. The Core Group recommended to discuss the future of the European education system considering diversity. It follows the importance of an adequate ranking of European universities in the field of engineering. Any ranking system needs to address the differences in education systems and to outline the criteria for excellence in engineering sciences on a scientific basis.

On the basis of a questionnaire processed by Euro-CASE member academies, Euro-CASE compiled "Best Practices" how to support the interest of young people in technical sciences and mathematics. The results were presented at the annual Euro-CASE conference in Stockholm. They were sent to EC President Manuel Barroso with a recommendation to start programmes on national levels in all EU countries with a goal to increase interest in mathematics, science and technology among children, to increase the competence of teachers in primary and secondary schools.

The above issues are dealt with also in the Czech Republic. The interest of young people in technical education slightly increases, however, with the simultaneous sharp downward slope of the demographic curve this increase is insufficient. At sectional workshops these issues were discussed and several recommendations proposed :

1. To invite successful graduates from various fields of study and to present them as examples worth following. To select successful students for this "recruitment" in master and PhD study programmes.
2. To involve future employers both from the viewpoint of profitable bids for jobs for graduates and to help in equipping school laboratories to ensure that education in particular disciplines is interesting and motivating.
3. Ranking of schools in the media appears to be counterproductive. The results of such ranking are misrepresenting and misleading.

4. There is a lack of younger enthusiastic teachers of mathematics (and also of physics and chemistry) who are able to grip the students.
5. Students should not be "tempted" financially, often natural motivation and greater pressure on the students is missing. Quality cannot be substituted by quantity.
6. Joint responsibility of the media is accentuated. Excessive emphasizing of careers where money can be earned easily, bad ranking of schools in the media, insufficient presentation of successes in technology and of their impact on the life of the society and the level of the gross national product.

The government of the Czech Republic adopted a recommendation in support of technical education.

Education ► job / labour ► prosperity ► base for a peaceful world and stability

Lack of knowledge / Ignorance ► poverty ► hate ► terrorism.