EUCEET Conference, Nov. 2011

Engineering Education Policies and Politicians…

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Which are the optimum procedures for **political** decision-makings regarding Engineering Education?

Engineers are not Technocrats; we do recognise the need for political solutions of societal issues, Education included.

Education, Why?

Existential needs

- Self-preservation
  - – Economy
- Self-confirmation
  - – Culture

    (Knowledge per se

    Aesth. satisfaction)

– Broader social interests
– Some contradictory issues
(economy, morality)

WHENCE

a Political component in decision-makings on Education

Nevertheless:

“Political” > activity of Politicians.

In modern **participative Democracies**, decisions are taken ONLY in concertation with Producers and Users, ONLY after thorough Studies of all possible consequences of proposals, and ONLY after a Pilot-application in small scale.

“Bologna” did NOT follow the rule.

Instead:

- quasi-mercantilistic fashions,
- hasty bureaucratic procedures,
- quasi-monopoly of Politicians in decision makings,
- and some Governments being more royalists than the King…

On the other hand, let us examine the fundamental importance of detailed **“job”-descriptions** of Technical Staff, in Design, Construction and Research (as well as their Region-specificity).

“Educated Engineering Staff”

A product for what?

a) Certified Technicians ?

b) Servicing and supervision of specialised every-day industrial production or works in design chains

(The traditional 3-years robust vocational Schools in Europe)

Germany, Switzerland, Greece…

(“INDUSTRY ENGINEER”)

University Professors are unable to produce such staff!

c) Design, Inspection, Construction of normal traditional and modern engineering products.

(The 4-years University level was necessary)

("ENGINEER")

d) As above, including innovative products,

plus

Research orientation

(The 5-years Univ. Level)

Recognition of Special parameters

(i) The quality of Secondary Education

(ii) Educational sources

- Intramural tech. education
- In-career complements

(iii) Development-specific parameters

- Economy profile of the Country
- Available broadness of the Market

The useless and obsolete term

“post-graduate”.

Lyceum $\equiv$ post-graduate

(of Elementary School!)

Compare the elementary character

of some courses offered

of the so called MSc level

of some Universities

(e.g. Prestressed Concrete missing in BSc level!)

Engineering Education befitting to a given "job"-description, leads to an appropriate "graduation".

For another "job", another education programme is needed.

No more nor less.

The underestimation of the economical and social importance of **vocational** Education: The enormous vacuum left in the heart of our Economies because of the "Universitisation" of prior professional Schools…

(A populist fashion throughout Europe…)

The good News:

The apparent inadequacy of the BSc in Engineering in U.K. (where the Continental “Integrated and Uninterrupted” system is actually adopted, “MEng”)

The best example Continental Europeans could possibly find:

The emblematic case of Cambridge University and Imperial College

where

only an **integrated and uninterrupted** title is offered: **M Eng**!

No “intermediate” 3-years title of BSc in Engineering exists anymore…

Ex. Imp. Coll. “Undergraduate Syllabuses”, 2008:

“Our courses are constructed to harmonise with the pattern of civil eng. education currently to be found in many of the elite institutions of continental Europe”.

Instead, our Politicians have “harmonised” us (by force) with the **abandoned** British system!!

This trend in U.K. is followed by many other british Universities, explaining that:

“The only reason for a student to consider a BEng rather that a MEng, is if the student is in severe financial difficulties or **does not intend to pursue** a career in Engineering”.

[King’s College, London]

Univ. of Sheffield:

BEng: **only** to those who because of unsatisfactory grades, are not allowed to continue towards MEng.

Univ. of Leeds:

BEng only to foreign students! [Continental students? Are we that much devaluated?]

Our (continental) European Politicians, however imposed to our Countries:

- an **obsolete** british system,
- already **abandoned** in U.K. (in favour of the successful European “integrated non interrupted” degree of University Engineer!)

Why?

Pretexts:

– “Lower educational expenses…”

– “Direct servicing of the Industry…”

But they have the responsibility **to prove** that this was precisely the result of the vane revolution they have proposed to our Universities. Did they really prove anything?

The rather unfortunate attempt of Bologna-scheme to produce an “Industry” Engineer in 3 years:

- Extreme difficulties in the 3-years curriculum itself.
- The distortion of the programme imposed to the followers of the 5-years scheme
- The unwillingness of the Industry to employ the “3-yearers”
- The unwillingness of the students to step-out after the 3-years…

Is it possible at all to produce an Engineer in 3-years?

(Why not a “half-MD” or a “half-Lawyer”?)

All attempts in the past have failed!

In University studies, fundamental scientific knowledge is initially needed:

– for the (most probable) continuation to the 5-years degree, and
– in order to face exponential obsolescence of knowledge.

If not, the economical harm produced to our Societies is enormous.

If yes, you cannot produce a “ready for the Industry” Engineer…

And if you say “all right, let us make it 4 years”, instead of 3, then who was talking about serious savings? And why all this mess?

On the other hand, the necessity of vocational robust practical 3-years studies in favour of Industry, remains unsatisfied…

Besides, there is a **hidden** increase of costs, because of the **distortion** induced in the curriculum of the 5-years stream:

Restricted initial orientation to fundamentals…

Costly posterior corrections!

Italian CPI

“These two, hardly compatible, educational requirements constitute the main difficulty encountered in the structure of the programme”.

[A. Stella]

Now, Real Statistics are Needed:

- How long it takes for the intermediate degree to be finalised?
- How many of your “Holders of Intermediate Degree” (HID) go out to the market?

  (Where are the profits of the Economy?)
- How many of your HID are really engaged in Industry?

  (Where is the initially advertised “will” of the Market?)

A remarkable view of the Rector of the Tech. Uninversity of Karlsruhe

"**Scope** of the studies of BSc Engineer is to make these graduates able to **complete** successfully the subsequent studies of MSc level **in order to apply** in the Profession the knowledge to be acquired"!

[No 78, 09.09.2008]

If so, I am just wondering

why all this mess?

And the USA?

American Society of Civil Engineers: Policy Statement 465 (2007):

"In such complex and rapidly changing times, it is unreasonable to believe that we can impart the specialized Body of Knowledge required of professional Engineers in just 4 years of formal schooling. Four years were considered the standard for medical, law and engineering professionals 100 years ago"!

ASCE (continued)

"The 4 year internship period **after** receipt of the BSc cannot make up for the formal educational material that would be gained from additional education".

USA D/nt of the Army
U.S. Corps of Engineers
[To ASCE, 30 June 2008]

"While demands on engineering curricula have increased, many schools have significantly reduced the credit hours required to earn an engineering degree. This trend is **counter to our needs**"

(A mercantilistic model failed in the USA themselves!)

“Your model of requiring the BSc’s Plus (MSc degree) for attainment of the formal educational portion of the Body of Knowledge is logical, practical and achievable”, concludes the American Ministry.

The American trend towards an **Integrated Uninterrupted 5-years** title in Civil Engineering, is the **second** anglosaxon proof of the complete validity and MODERNITY of the traditional European Educational System in Engineering.

Is this wealth of facts known to the European Politicians?

Obviously, one **could not expect** the European Politicians to know all this subtleness of Science, Technological development, and the needs of the real Economy in the **long** run…

Since they have not followed the basic democratic rule “Concertation, Thorough Study, Pilot Application” etc., their glamorous decisions are condemned to be harmful to our Societies.

– Inadequate information
– Short-sighted mercantilism
  (against the real interests of Industry)
– Some arrogance of the power (?)

may partly explain the wrong directions in decision makings…

But what about **OUR** responsibility?

Now the moment came for a thoughtful reconsideration…

Let us reiterate the need for rational-pragmatic job-descriptions, to be served respectively by Education (accounting also for Country-particularities)

The means:

a) 3-years robust **non-university** studies (real “Industry” Engineers on narrow sub-fields),

b) 4-years intensive University studies (if a national Market has a rich sector of medium-level Technology to serve),

c) 5-years normal University studies aiming at medium and high Technology, on the one hand, (especially in small Countries with local Industry reluctant to offer in-career education), and able to initiate possible doctoral studies, on the other;

Overall cost-effectiveness should always be considered.

And **how** we will label the “I.U. 5-years” Engineer?

Anything else but “Master”!

The confusing (if not provocative) term “Master”:

- The confusion with the old-styled MSc: Engineering is a considerably broader intellectual process that Science
- Who are really the “Masters” in our world of Today?
- Why a Region-specific term was used to express a successful European tradition of University Engineering Education?
- The Bologna Master simply befits the needs of a really Professional Engineer; nothing more nor less. It has nothing to do with… “post-graduate” courses (after a manifestly inadequate BSc).

Now, in the name of Rationality and (above all) in the name of OVERALL Economy,

let us copy (again!)

– the recent British and
– the coming USA examples

i.e. let us come back to the modern 5-years University Engineer (FUNENG), without all this extremely confusing, ineffective and costly “experiment”!