

**General Subject: “Power System Engineering Education  
for the Network of the Future”**

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**Subject: Essay on sustainable and promising engineering education**

1. Tertiary education: Sources and experiences during recent centuries
2. Meta-capitalism age and the Bologna Declaration
3. Some essentials about suitable and adaptable engineering curriculae
4. The genetic deviation of the market’s «cost-effective» approach in education and research
5. Epilogue

## 1a: Tertiary education: Sources and experiences during recent centuries

### i. Europe and the tertiary education:

- Cradle of the historic notion of “universitas”, for mathesis universalis.
- Founder of a binary quality model for the world domination during the industrial age, with
  - a multitude of post-secondary-education professional schools for the basic needs,
  - engineering centers of excellence (colleges, grandes écoles, etc) for the high-level needs in technology and management.

## 1b: Tertiary education: Sources and experiences during recent centuries

### ii. Prevailing university structures:

- The one-step continental Europe system, with unified curriculae, leading directly to the Master's level.
- The two-steps Anglo-Saxon one, with a first lower step, the bachelor's level.

### iii. Exponential growth of knowledge in natural sciences-technology and educational consequences:

- Pressing demands, both from engineering students and academic staff, for an increase of the duration and the facilities of curriculae.
- Professional bodies consideration that a Master's degree in engineering is the necessary prerequisite for facing the challenges of and adapting to the rapid advances in sciences, technology and all production processes.

## 1c: Tertiary education: Sources and experiences during recent centuries

### iv. Conclusions:

- The continental European model is already successfully being applied by some of the best Anglo-Saxon engineering schools.
- The two components of tertiary education -universities or equivalent engineering institutions and the post-secondary professional schools- satisfied the rapid development and leadership of western countries during the last four centuries.
- They both have reached an equilibrium of complementary and harmonic coexistence, until Thatcher's education reform of the eighties and the Bologna declaration in 1999.

## 2a: Meta-capitalism age and the Bologna Declaration

### i. The mankind's new meta-capitalist age:

- By the end of the Keynesian golden years, (1945-1975), we lived the restoration of the market's «laisser-faire», under the costume of neoliberal ideology.
- This re-domination of classical economics was strengthened by the almighty development of electronics communication and information processes.
- Using this new superpower and abusing the weaknesses of western political leaders, the speculative international funds activated the mutation of the known capitalism towards a new, non-productive shape.
- After the final collapse in 1991 of the «adversary awe», the Soviet Union, this mutation has been politically completed and the winners imposed the meta-capitalism age all over the world.

## 2b: Meta-capitalism age and the Bologna Declaration

### ii. Impacts to the university-level education. First steps:

- The leading funds pushed also for the abolition of public utilities in order to buy the capital-intensive state investments at humiliating prices.
- Public goods were transformed into commodities, among them university education.
- In the eighties, Margaret Thatcher kick starts the commercialization of higher education's diploma, with the virtual and inexpensive upgrading of polytechnics to universities.
- She was followed by the leaders of continental Europe, through their political refusal to provide sufficient financial support to the exponentially increasing demand for university degrees.

## 2c: Meta-capitalism age and the Bologna Declaration

### iii. The Bologna declaration

- Pressed by the finance ministers and the private investors, the neoliberal oriented officers in Brussels imposed the Bologna Declaration signed on June 1999 by the ministers of Education of 29 European countries.
- The Bologna Declaration is a key statement on higher education policy and reform in Europe, driven by the participating countries but also involving the European Commission as a key partner. It contains the following four main actions of a process, which theoretically aims to diminish differences between European higher education systems.
  - Reform of higher education systems, where specific reference is made to the adoption of “a system essentially based on two main cycles”.
  - The degree awarded after the first cycle shall also be relevant to the European labour market as an appropriate level of qualification.
  - Adoption of a system of easily readable and comparable degrees.
  - Establishment of a European Credit transfer System (ECTS). A Diploma Supplement should incorporate the ECTS transcripts.

## 2d: Meta-capitalism age and the Bologna Declaration

### iv. The practical goals of the Bologna declaration

- The camouflaged main goal of the Bologna Declaration was the dramatic cost-reduction of basic university education, through two structural measures:
  - The shortening of curriculae duration, (maximum three years) and
  - their emaciation from all expensive infrastructures.
- It has been obvious from the very beginning that it is not possible to decrease curriculae without downgrading their fundamental university nature, their specialization skills and finally their commercial value.



## 2e: Meta-capitalism age and the Bologna Declaration

### v. The Bologna Declaration consequences:

- Thirteen years after the implementation of this "declaration", its immoral mixture of goals, has trapped the professional future of many thousands young students. Most of them are rejected by the actual labour market.
- These «desperados» graduates are fighting to upgrade their qualifications through a Master's degree, which usually fails to cover their basic structural gaps.
- The massive creation of a low-cost university level work-force for the satisfaction of the clients demand for university titles, ultimately led to unproductive educational expenses.
- The greek experience: The Bologna Declaration was also implemented in Greece,(2001), through the political endowment of the university status to technological institutions. The failure of this virtual upgrading created four thousands “desperados” technologists.

## 3a: Some essentials about suitable and adaptable engineering curriculae

Answers on the two first and the fourth topics of the EPEE Session are offered from the long «trial and error» history of all curriculae in applied sciences, including the engineering ones.

### **i. Structural properties for effectiveness in the production processes and endurance through time:**

- Building of a wide-oriented, coherent and strong scientific substructure, during the first 30 to 40% of each curriculae, without premature and shallow specialization courses.
- Cultivation from the very beginning of methods for independent access to the continuously sprinkling sources of knowledge and skills for synthesis, human communication and collaboration.
- Development of the broader personal and social virtues for the emergence of integrated personalities, disposing the culture to stand as responsible workers and managers of staff and projects and exist as conscious, free citizens.

## **3b: Some essentials about suitable and adaptable engineering curriculae**

### **ii. Obvious deviations from the well structured engineering curriculae:**

- The “idealizing” of mobility from the E.A. political leadership, reaches the point where students acquire easy educational credits throughout Europe.
- They finally achieve professional recognition without coherent studies and obtain a degree without solid basis and a clear “identity” for the labour market.

### **iii. Urgent need for academic decisions based on actual investigations:**

- Declaration that serious studies mean systematic labour and pain.
- Reorientation of the mobility structures and prohibition of any inconsiderate transferability of credits.
- Rejection of diploma from the markets’ oriented virtual universities, based on the advertisement to the student-client: “come to us, don’t worry, be happy!!”.

## 3c: Some essentials about suitable and adaptable engineering curriculae

### iv. Engineering professional bodies should declare that all recognized engineering schools are obliged,

- to clarify that the collection of «bricks and mortar» is unable to support the formation of a university-level degree,
- to guarantee for their students a structure of well organized, coherent and continuous studies, leading directly to serious degrees, equivalent to the Anglo-Saxon master level,
- to demystify and shorten the kinesitherapy and the credits collection of students and staff, by evaluating seriously with objective standards, the real benefits and losses from the mobility programmes,
- to strengthen their educational and research human resources with generous scholarships for real studies and long-term programmes for transuniversity collaborations.

## 4a: The genetic deviation of the market's «cost-effective» approach in education and research

Regarding the third and the last topics of the EPEE Session about the role of research in education and whether they both should be «cost-effective», the answers must be seen within their evaluation goals.

### i. General principles:

- Genetic connection between research and education.
- Research is both a right and an obligation for each teacher and student and should be exercised in conditions of academic freedom.

### ii. The evaluation structure:

- Systematic and objective critical analysis, of all university components.
- Transparent public presentation of the evaluation conclusions and clear proposals, especially on the weaknesses of research and educational programmes.
- Subsequent correcting operations of their institutions.

## 4b: The genetic deviation of the market's «cost-effective» approach in education and research

### iii. The financial entrapment:

- The generous public and private funding of research for technology purposes is motivated by the economic exploitation of their commercial results. Sometimes useful, often damaging and toxic- for the daily life of the homo-consumer.
- Consequently, the free and pure scientific research in areas without visible economic value is without financial support by the applied research market.
- However, all regenerating scientific experiences demonstrate that research can't be quantified and restricted by short-term profit.
- The innovating research contribution is in principle not only commercial but multidimensional, just like the human brain's values.

## 4c: The genetic deviation of the market's «cost-effective» approach in education and research

### iv. Conclusions:

- The research and education sizes are primarily qualitative entities. Their evaluation is complex and in no way can be replaced by a short-term economic efficiency, i.e. the sale indicators of usual goods in the current market.
- By offering absolute power to some specific indexes of university knowledge based on the demand from the students and the "market",
  - we push to a massive retreat the fundamental basis of pure sciences, because they do not "sell" and
  - we disregard the new ideas, because they are not objectively measurable.
- The preservation of each pure, spontaneous, restless, exploratory spirit, the survival of the invaluable long-term social benefits from researchers, struggling outside the market, are
  - the alter-ego of our holistic development and
  - remain essential to avoid teratogenesis.

## 5a. Epilogue

### i. The EPEE question and the market's choice

- The main question raised by the EPEE Session, Paris 2012, is «bien posé»: How the engineering education will maintain and/or regain its status of high/solid scientific quality and sustainable value in modern societies and their labour market?
- The trend of the post-capitalism educational policies is to transform the majority of engineering schools into providers of superficial skills with the exception of some excellence centers for wealthy students. Judging from its effects to social welfare and the economic growth, is this market choice right or wrong?

### ii. Citizens' rights and historic experience

- The indisputable democratic right of any willing and intellectually qualified citizen in education is completed by the state's offer of access to university-level studies.
- History during the last four centuries proves that, in the long run, investments to state universities of high standards are also beneficial for the markets, obviously more productive than short-term satisfaction of economic indicators and interests.



## 5b. Epilogue

### iii. Overstepping the market's choice

- Beyond the condemnation of the already discredited Bologna Declaration, the EPEE's pressure should be focused on the adoption of a generous state financial support for
  - real engineering education,
  - free fundamental research,
  - massive scholarships for real studies and
  - rigorous evaluation of all virtual engineering schools.
- Given the actual meta-capitalism occupation, I am afraid that the above are not enough. We cannot abandon new generations to the usual leadership of cynical neoliberal economists.
- We must supply new engineers with the needed culture for a broader social fight, in order
  - to regain the political recognition and
  - change the present miserable situation of the one-dimensional, homo economicus.