

Some remarks on the transition from the elite through mass to universal model of higher education: a challenge for Europe

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This talk is dedicated to Óbuda University, a very special higher education institution who has been privileged to have for many years presidents (rectors), deans, professors, younger research collaborators, and a supportive administrative staff, who have tried hard, and then maintain, the highest education, research and ethical standards that have helped the University to face huge challenges of deep changes our part of Europe has faced over the last two decades or so, and to reach a world level

The topic of my talk, on **higher (tertiary) education**, may seem strange because:

- I am by training an automatic control engineer, who has in my earlier years (in the 1970s–1980s) moved into optimization and systems research/analysis,
- in next years I have been involved mostly in fuzzy logic, notably:
 - fuzzy optimal control and fuzzy dynamic programming (IEEE CIS Fuzzy Pioneer Award in 2006),
 - fuzzy multistage models for sustainable regional development planning (works for many regional development projects at the International Institute for Applied Systems Analysis (IIASA) in Laxenburg, Austria, notably for the Tisza Region in Hungary (real large scale work!)),

- fuzzy database querying (and linguistic summarization) with industrial, banking, corporate, etc. implementations, and a commercial software.

But is the relation to Óbuda University?

Professor Lotfi A. Zadeh (received the **honorary doctorate from Óbuda University in 2011!**)

And he has a huge impact on my career because he has practically pioneered or “co-pioneered” all what I have been involved in (fuzzy logic in optimization, control, systems, databases, etc.)

On the other hand, Óbuda University:

- has gained a very high reputation in fuzzy logic and technology (notably Professors Rudas, Fodor, Varkonyi-Kóczy, Fullér, to name a few).
- may be a **good example of modern trends** in higher education.

So, I have been frequently visiting Lotfi A Zadeh at the University of California, Berkeley, meeting many famous people, e.g., Alfred Tarski, Elya Polyak, Charles Desoer, etc. but have once encountered:

- Professor **Martin Trow (1926 – 2007)**, from 1976 to 1988 Director of the Center for Studies in Higher Education at UC Berkeley.

Basically, he:

- was born in New York City in 1926, got the MsC in Mechanical Engineering at the Stevens Institute of Technology, worked as an engineer,
- but in 1948 began his graduate studies in sociology at Columbia University,
- got his PhD from Columbia in 1956 (Zadeh in 1949),
- in 1957 he joined the Sociology Department at UC, Berkeley (Zadeh in 1959!)

A natural question: why do I speak about Zadeh and Trow?

First, both are famous

Both are great “innovators”:

- **Zadeh**: pioneering works on signal analysis, decision analysis, state space approach, stochastic control, and finally fuzzy logic and possibility theory,
- **Trow**: first described and analyzed the **transition in higher education from elite to mass to universal student access** culminated in a special 1973 paper for the Organization for Economic Cooperation and Development (OECD) that addresses the **global challenges and opportunities**.

A great surprise to me was: *A theory of higher education?*

So, what is the problem?

Basically, it has been obvious since the beginning of the mankind that:

- the education is crucial for the prosperity, even survival, of individuals and societies,
- this is particularly true for the higher (tertiary) education, “to be or not to be” for virtually all societies,
- also crucial for us (who will be available as assistants, PhDs, ...)

However, following **varying social and economic needs**, the education has undergone many changes over centuries, notably over the last century or slightly less, mainly after World War II.

The best account of those changes is due to general works on higher education, notably by the late Professor Martin Trow from the University of California, Berkeley.

In particular, he discussed a crucial issue of the **transition of the higher education** from an elite one, meant for a few chosen ones, to the one serving the “mass market” which has been implied by deep social and political changes mainly after World War II but also by **growing needs of business, industry and the military**.

Some history maybe interesting (concentrating on Europe):

- the European university system is some 1,000 years old, and among the oldest universities one can quote, just to name a few:
 - in the Southern and Western Europe: Bologna (1088), Paris (1150), Oxford (1167), Modena (1175), Palencia (1208), Cambridge (1209), Salamanca (1218), Montpellier (1220), Padua (1222), Naples (1224), Toulouse (1229), Siena (1240), Northampton (1261), Coimbra (1290), etc.
 - in the Central and Eastern Europe: Charles, Prague (1348), Jagiellonian, Cracow (1364), Vienna (1365), Pécs (1367), Heidelberg (1386), **Óbuda (1395, reestablished in 1410)**, Leipzig (1409), Rostock (1419), Uppsala (1477), Copenhagen (1479), etc.
 - finally, in the USA: Harvard (1636), Yale (1701), Princeton (1746), Columbia (1754), Pennsylvania (1740), etc.

The “very essence” of the higher education in the past (until even ca. 1800 or the early 1990s, or even World War II) was:

- they were what Trow call “elite universities”, i.e.
 - meant for students from privileged social classes who have had financial means to cover the education for their children (with some exceptions),
 - supposed to provide a more gifted young population to learn some **non-vocational, more sophisticated and intellectually challenging** skills,
 - not meant in principle to provide a profession or trade for earning money for living.

All that for the ruling or intellectual elite ...

Therefore:

- the elite higher education has implied a **limited access** to that type of education that has therefore been considered a **scarce good or resource**,
- this was **against aspirations** of many, also increasingly strong social classes who had had not been meant to have access to scarce and limited resources due to their social status or insufficient financial resources,
- these people have started requesting a **fair and just distribution of goods**, including a **just access to higher education**; this has basically been the very essence of all kinds of workers', peasants', socialist, communist, etc. movements.

However:

- more and more university students and graduates had to learn knowledge that would make it possible to **make a living**,
- therefore, more **“useful” things** should have been taught, like engineering, with an obvious change of the traditional meaning of an university!

A turning point was World War II (and a period before and after):

- the needs of war have triggered a **refocusing** of the functioning of universities, their curricula, financing, founding new schools and departments, etc.
- funding has been directed to those universities, schools and departments, even research groups, who have been able to **“produce” solutions to be useful**, initially for the victory over the Nazis, then to compete during the Cold War,
- the whole world has needed an **economic breakthrough** via competitive product and services.

All that has changed the higher education scene with the top American universities becoming the leading players in virtually all areas

But, to attain that level, and stay competitive, in virtually all countries it has become obvious that:

- a **fundamental change** of the university system is needed: from the elitist one of the past, of a relatively low scale, to the **new, mass access type**, open to more and more (young) people, not only from privileged classes,
- this new system would need **radical changes**, notably related to the transition of to free, semi-free, scholarship based financing – **expensive!**.

Such a **transition to mass education** has had many aspects and has manifested itself in various ways:

- first of all, the growth rate of the number of students has increased rapidly, doubled in the 1960s and 1970s during just some 5 years; the same for the number of universities,
- the percentage of young population enrolled in higher education institutions, which in most developed countries was at the level of 4-5 % just after World War II, increased to ca. 10-20 in the 1960s–1970s, reaching ca. 30% in the beginning of the 2000s, and with the goal set at 50% or more for a not so distant future ...

what about the quality ...

Is this all what can be imagined?

Of course not, there is much talk about a next phase of development that can be called an **universal access education**.

It has much to do with the Internet and Web technologies that make the access to information and knowledge to everybody, practically free of charge, from any place, at any convenient time, etc.

We will not deal with this here

What is the reality?

An interesting element of that mass type higher education is the system being implemented in Europe, and is called the **Bologna Process**, launched in 1999

Aimed at coordinating the developments of national higher education systems into a really interconnected and unified higher education system.

For instance, to improve and facilitate the recognition of degrees and academic qualifications to increase mobility of students and professors.

From our point of view, the Bologna Process system introduces basically a **three degree higher education system** for:

- Undergraduates, i.e. who get Bachelor (BA, BS, Engineer, etc.) degrees,
- Graduates, i.e. who get Master (MA, MS, Diplom-Ingenieur., etc.),
- Doctoral graduates, i.e. who get Ph.D. degrees.

Obviously: this is a sign of an **extreme mass type higher education system** . . .

Many advantages:

- meets needs and aspirations of the modern European society, notably young people,
- “politically attractive” as it somehow promises to so many young people the access to the “elite” in the sense of being able to enter a relatively small circle of top graduates in quite a natural and straightforward way.

But: not “all that glitters is gold”, and there has been some critique

As for the PhD degrees, to be specific:

- a fast “school like” (courses, labs, etc.) process, as opposed to slower and longer more personal “student – mentor” relations may not be proper for those interested in an academic or research career,
- a larger number of PhD graduates does increase the **human and social capital** but only if these people are “absorbed” by the system.

Unfortunately, this great ideas has not always been implemented as:

- in most countries the number of openings for positions at universities or research institutions does not follow a rapid increase of the number of PhDs – cf. how many PhDs from Spain, Portugal or Italy work in other countries,
- it has not been taken into account that in some countries it is normal that PhDs can find jobs in banks, public and even local administration not to speak about the industry while in some it is rare.

- This all leads to a high level of unemployment of young people, seemingly better qualified, in some countries, and a natural question is: what to do?
- The best way is usually to look at good example, with a low (or very low) unemployment rate of young population

For instance, in Europe: Austria, Germany and Switzerland who have youth unemployment percentage below 8 % against 56 % in Spain and 38 % in Italy (The Economist)

Why?

These countries have a tradition of **combining apprenticeships with formal schooling**. Basically, from 1969, ca. 2/3 of youths sign up for a program in which they work three or four days a week for a firm that pays them and teaches some useful skills, and the rest of the time they spend in school, completing mostly specialized courses.

About two in three young Germans go through this system and into about 350 professions, and all is coordinated with chambers of commerce.

Importantly, the system does not preclude a further entering a university for motivated and gifted people!

Why these remarks?

Óbuda University has followed to some extent the above general positive tendency because after World War II, in line with a trend to provide vocational training to meet needs of the growing industry and aspirations of a growing number of young people, the 3 colleges:

- Donát Bánki Technical College,
- Kálmán Kandó Technical College, and
- The Technical College of Light Industry,

have been integrated in 2000 into Budapest Tech that has quickly gained a high reputation, with The Doctoral School of Applied Informatics established in 2009.

Finally, by reaching a very high academic level and having a necessary spectrum of fields covered, Óbuda University has

That is:

- Óbuda University may be a very good and successful example of Trow's theory,
- it is certainly an example of a proper transition to mass access higher education in the modern sense of a proper balance of high level, more vocational training and high level research,
- maybe this is the way for many universities in Europe and elsewhere to go, i.e. to somehow attain a **elite type mass access higher education?**