



ASCE Structures Congress
Orlando, Florida, 12-15 May 2010

**Educating the Civil Engineer
for the Coming Decades –
A EUROPEAN PERSPECTIVE**

Tugrul TANKUT
Turkish Chamber of Civil Engineers



A CLARIFICATION

- The views expressed in the present presentation should not be considered as the general understanding in Europe.
- They belong to a group of professors conducting the “Effective Education” project of ECCE - The European Council of Civil Engineers.



OUTLINE

- About ECCE
- The perspective
- The ongoing project
 - Problem identification survey
 - Survey findings evaluation workshop
 - Foresight study
 - Expected outcome
- Concluding remark



ABOUT ECCE



ABOUT ECCE

European Council of Civil Engineers

- Is a semi-official European association registered in London, UK.
- Currently includes 25 member countries.
- Each represented by only one civil eng body; association, chamber, society etc.



ABOUT ECCE

European Council of Civil Engineers

- Aims at the betterment of the civil engineering practice across Europe.
- Operates through Standing Committees coordinated by the Executive Board.



ABOUT ECCE

Standing Committees

- Professional Recognition & Mobility
- Education & Training
(Task Force “Effective Education”)
- Knowledge & Technology
- Environment & Sustainability
- Development & Business Environment



PERSPECTIVE



THE STARTING POINT

- As a young man, the speaker was a successful instructor thirty years ago.
- He is doing his job much better now.
- Alas, he is a total failure today. Why?



BECAUSE

- The conventional educational system does not seem to be effective any more.
- Because, it is not compatible with the changing conditions. Thus,
- Any meaningful improvement proposal has to be based on a clear understanding of the changing conditions.



CHANGING CONDITIONS

- Scope of “civil engineering”
- Student capacity & perception
- Educational tools
- Educational policies

have significantly changed
in the last few decades as a result of ...



CAUSES OF CHANGE

- Unimaginable rise of the computer
 - That of the Internet in particular
 - Endless developments in ICT
- and many other secondary factors cited in a recent paper by the speaker...



CHANGING SCOPE

- The changing scope of civil eng has been neatly and very wisely formulated in the ACSE Vision 2025 & its Roadmap.
- No need for a single further word
or perhaps a small remark...



VISION 2025 & ROADMAP

- Actions recommended by the Roadmap towards each vision are very sensible.
- Each list of actions suggests inclusion of a new subject in the CE curriculum.
- Impossible, unless a paradigm change takes place in CE education philosophy.



CHANGING STUDENT

- Object of education is twofold:
 - Information transfer and
 - Intellectual (**reasoning**) improvement
- Students seem to grow more reluctant to improve their reasoning capacity and more enthusiastic to store information!

What a resemblance...



CHANGING STUDENT

Please note the resemblance:

In each consecutive computer generation,

- Memory increases exponentially, but
- Reasoning can never go beyond “IF and GO TO” logic.
- Indeed, the computer appears to have affected human perception significantly.



CHANGING STUDENT

My students' brains operate on the same principles as the computer does:

- They store as many solved examples (templates) as possible.
- When they get a problem, they scan through their memories. If it matches one, they are lucky. Otherwise, helpless.



CHANGING STUDENT

- Computer is a powerful tool for the old generation; it is the way to exist for the young. S/he does not exist without it.
- Engineer was the master in the old days, computer the slave; now, vice versa.



CHANGING EDUCATIONAL TOOLS

Here are a few examples:

- Blackboard is replaced by Power Point.
- Slide rule (the ingenious instrument) is replaced by Excel spread sheet.
- Engineering Drawing (a serious course) is replaced by AUTOCAD training.



CHANGING EDUCATIONAL TOOLS

- Term papers required literature survey; cut & paste from the Internet settles it.
- Copying the posted exam solution is replaced by telephone-camera shots.
- No need to ask the seniors, all the past exam solutions are available at the photocopy shop for the price of a beer.



CHANGING EDUCATIONAL TOOLS

To cut the long story short,

- Acquiring information was not easy; many things were learnt in the process.
- Now, it is easy to acquire the tools.
- **Acquiring the tool is not everything.**
Filing the exam solution does not help, unless it is understood by hard work.



NEED FOR PARADIGM CHANGES

- Changes explained are irreversible facts.
- The present educational system should be modified on the basis of these facts.
- But cosmetic changes (in curriculum, tools, techniques etc.) are not sufficient.
- **Paradigm changes are necessary.**
New concepts, new approaches, new definitions, new institutions are needed.



ONGOING PROJECT



OBJECTIVES

- To identify the present problems of civil engineering education, the underlying causes, the expected developments.
- To formulate alternative approaches to overcome these problems.



SCOPE

- Identification of problems of civil eng education in participating countries with their universal and local dimensions.
- Formulation of educational techniques compatible with the changing conditions.
- Drafting a meaningful report and a feasible ECCE position paper.



METHOD

- A problem identification survey
 - Quest 1 - Faculty
 - Quest 2 - Senior students
 - Quest 3 - Practicing civil engineers
 - Quest 4 - Employers of civil engineers
- A workshop to evaluate survey findings
- A foresight study, if possible



EXPECTED OUTCOME

- A comprehensive document reporting the work and the findings
- An “ECCE position paper” presented to the national and European authorities.



CONCLUDING REMARK



ANOTHER CLARIFICATION

- Comments about the students should not be misinterpreted as a criticism.
- They are a self criticism of a few old men who admit their failure to adapt their techniques to the changes.
- New students are neither less bright nor less industrious than their elders.
They are a different breed.



THANK YOU

for your attention...