UNIVERSITY OF Southampton

Industry meets academia: what should future geo-engineers be learning in school?

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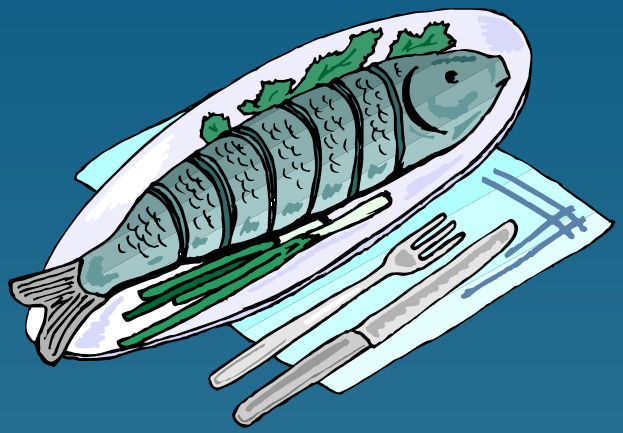
HICKS


I'M TEACHING

Change of focus

Teaching  Learning



- Different students
- Learning style
- Vocation
- Personality

- We need to allow for the differences in students and their learning styles

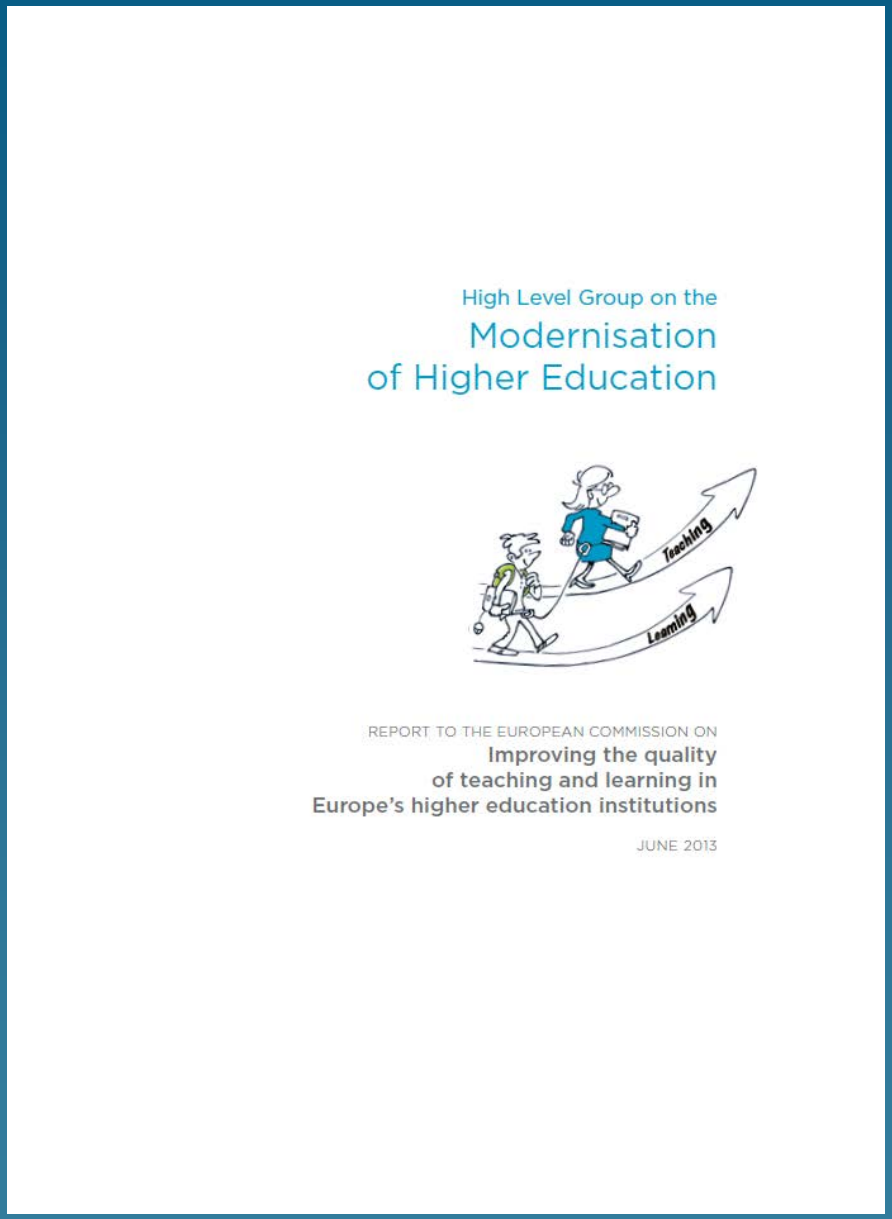
How can we do this?

http://ec.europa.eu/education/library/reports/modernisation_en.pdf

Report to the European Commission on

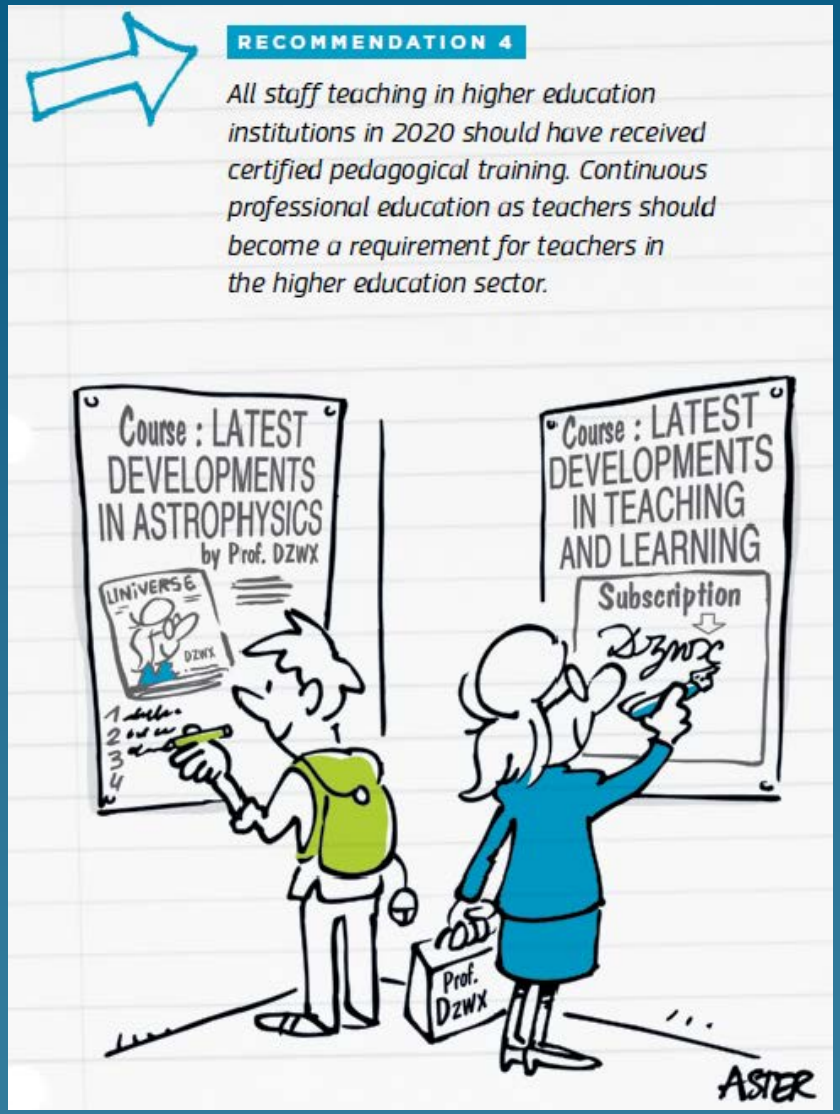
Improving the quality of teaching and learning in Europe's higher education institutions

High level group on the Modernisation of Higher Education. June 2013



16 recommendations for improving the quality of teaching and learning

- “Acknowledging teaching as a skill”
- “All staff teaching in HE institutions in 2020 should have received certified pedagogical training”
- Researchers versus / and teachers



In “Report to the European Commission on Improving the quality of teaching and learning in Europe’s higher education institutions”, High level group on the Modernisation of Higher Education. June 2013

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- "Learning to learn"

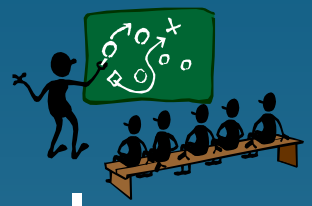
"Efforts need to be concentrated on developing **transversal skills (soft skills)**, such as the ability to:

  - think critically,
  - take initiatives,
  - solve problems
  - and work collaboratively

that will prepare individuals for today's varied and unpredictable career paths."

Active learning

Several definitions



Active learning

Students do meaningful activities and reflect on their work

≠ ?

Traditional teaching in engineering

By involving homework and lab work seems “active”

Prince (2004)

Active learning

Any instructional method that engages students in the learning process.

Prince (2004)

Core elements

- Student activity
- Engagement in the learning process

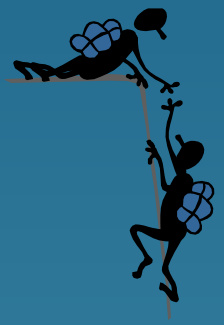
Active learning

Prince (2004)

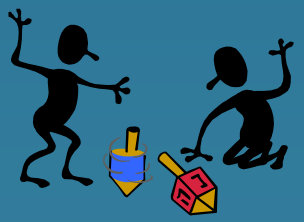
Common forms most relevant for engineering faculty

- Collaborative learning

- Cooperative learning



- Problem-based learning



What should we focus on?

- Fundamentals are essential. Examples:
  - Soil as a particulate material
  - Concept of effective stress
  - Stress and strain at a point
  - Mohr circles (stress and strain)
  - Stress paths
- Physical models and handling soils
- Learn engineering in its context (role play, case studies)

Geo-engineers

Learn at school

What

How

When

Where

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Questions (I)

Geo-engineers

- What are geo-engineers?
  - Civil
  - Geotechnical
  - Geological
- Should the requirements be the same or different?
- Work done in TC306 by Prof. John Atkinson

Questions (II)

- Which competences should be learnt at university?
  - Technical only
  - Soft, transferable and generic skills

Questions (III)

- Does the “how” future geo-engineers learn make a difference to industry?
  - Traditional teaching (lecturing) versus active learning

Questions (IV)

- What is / should be the role of internships and/or industry scholarships for students?

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