Educational Trends in Engineering for Hard and Soft Skills

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Initial questions

- What is engineering
- Hard skills
- Soft skills

Engineering

- Capability to design a new artefact that satisfies some human need
- Synthesis
- Creativity
- Humanity

Hard x Soft

- Hard skills usually uses logic brain center. Soft skills usually uses emotional intelligence.
- In hard skills the rules stay the same regardless the circumstances. In soft skills the rules changes depending on the company culture and people you work with.
- Hard skills can be learned in school and from books. Most soft skills are not taught well in school and have to be learned on the job by trial and error.

Hard skills

- Predictive description of system development
- Causal relationship
- Critical thinking

Soft skills

- Language professionality
- Communication of ideas
- Mutual understanding
- Exchange of emotions
- Empathy
- Teaming
- Creative thinking

Trends

- E-learning
- Internet
- Computer aided methods
- MOOC
- Tacit knowledge
- Mentoring
- Coop
- Alumni association

„New“ teaching methods

Hard skills

- Computer aided methods
- Alive textbooks
- (Remote, virtual) Experiments

Soft skills

- Direct practice
- School as game
- School as practice

Basic questions

- Ratio and sharing of
  - e-learning and human teaching
  - self-learning and force-learing
  - explicit and tacit knowledge

Trends

- Case study
- Grounded theory
- Action research
- Narrative analysis

TRIZ approach

- Increase in Ideality
- Follows the S-Curve
- Increase of Controllability, Flexibility, and Dynamism
- Uneven Development of Parts
- Alternate Simplification and Increase of Complexity
- Increase of Segmentation
- Matching and Mismatching Parts
- Lesser Human Involvement

Conclusions

- More self-learning
- Less teacher-learning
- More computer based learning tools
- More human-interaction learning methods
- From reactive to proactive approach