The first 1 semester(s)’ experiences from KTH

How to design introductory periods to ensure that students will succeed in their studies

German Rectors Conference Berlin
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Is the composition of the student body more diverse?

- In Sweden, 40% of twenty year olds should continue to higher education due to government decision (2011)
- In Sweden, 35% of the students in higher education have at least one parent with a university degree, at KTH 50% of the students have at least one parent with a university degree (2011)
- In Sweden, 17% of the students in higher education have an international background (were born or both parents were born in another country), at KTH 28% have an international background (2011)

Reference: Swedish National Agency for Higher Education
How should engineering departments reflect diversity among students?

• Design the introductory period by implementing an Academic Introduction Course during the first semesters

• The Academic Introduction should introduce the students to academic studies as a whole since it might be a completely new and unknown field to them and explain the meaning of specific concepts, how it works and who is who at the University

• Let this Academic Introduction continue at least during the first year, or more, since the students meet new situations continuously

• Encourage students to feel that they belong at the University

Examples: ATTRACT WP8 case study “KTH Programme Integrating Courses”. Introduction Course at Uppsala University.

How can introductory periods be successfully designed?

- High expectations (let students know you expect them to be successful)
- Timely support (aligned to the demands of the classroom, for example on study skills or math's support)
- Academic and social support (promoting classroom engagement and cooperative learning that require students to work together and become active and responsible for their learning)
- Assessment and feedback (frequent to promote student success)

References:

What measures go beyond teaching duties and who is responsible for them?

• Teachers and Academic Staff are essential when it comes to promote student success
• Other staff e.g. student counsellors and administrative staff are also important
• All staff should preferably be involved in introducing new students
• Older students, student union and associations can also contribute
http://www.attractproject.org/

Enhance the Attractiveness of Studies in Science and Technology

German Rectors Conference – International Engineering
October 29th 2012

Mats Hanson
KTH Royal Institute of Technology
Via ATTRACT it is our intention
to discuss and conduct development work within four
different areas:

• **The attractiveness of being an engineer**
• Formal hinders/barriers
• Attracting students to studies in science and
technology /engineering education
• Student retention – including
  First semesters experience
Setting the scene
The first phase 2010/2011 (WP5)

• Defining an Engineer- the Engineering brand
• Perceptions on Engineering in Society
• Labor Market for Engineers
• Media Coverage
I. Defining an Engineer

“professional practitioner of engineering, concerned with applying scientific knowledge, mathematics and ingenuity to develop solutions for technical problems”.

Wikipedia
Defining an Engineer

• Professional practitioner of engineering,

• Formal requirement or certificate to work as an engineer is different from country to country
  – Chartered engineer
  – External accreditation body
  – National accreditation body
Competencies and skills of future engineers

Cross-disciplinary competencies
- Sustainable development, ecosystems and life cycle thinking
- Safety and risk management (IT security)
- Business and entrepreneurial skills
- Strong supportive skills to core competence
- Usability and production of technology

Core competencies in engineering
- Mathematics and natural sciences
- Discipline-specific engineering skills
- Methodological skills; plans, models and solutions

Interaction, internationalization and organizational skills
- Global value networks
- Shared expertise, collaborative learning and facilitation skills
- Internationalization and multicultural skills
- Knowledge management, management and accomplishment of mobile and decentralized work
- Competence management

Life long learning
- Responsibility and ethics
- Professional well-being, tolerance for stress and uncertainty

Creativity and innovativeness

Values and attitudes

Formal of concept structured by Portuguese Order of Engineers, 2010
Academic and Vocational Engineers by different education

FIGURE 5.
CESAER-Declaration—Picture Unterschied zwischen universitärem und Hochschulstudium. Educational System for engineers in Germany (Hampe, presentation: EU-US Partnerships to Attract Young Talent – The TU Darmstadt – Virginia Tech Example [10].

4 November 2011
II. Perceptions on Engineering in Society
Positive Views on Engineering in Finland

FIGURE 7.
List of statements on working in the field of technology, plus typical features of engineering work 5 = Agree entirely, 4 = Agree by and large, 3 = Difficult to say, 2 = Disagree by and large, 1 = Disagree entirely.
Source: TECHBARO 2010

Learn new things
High income
Engineering and Health is hard to study

Easier  Equal  Harder

- Health
- Management
- Law
- Economics
- Psychology

3 October 2012
Freshmen and graduates over the years in Germany is increasing but drop out rate high


Freshmen

Retention??

Graduates

**FIGURE 8.**
Freshmen and graduates over the years Ref. Studien–bzw Prüfungsjahre 2000-2009
III. Labour Market for Engineers
Labour Market for Engineers
lessons learned

• One important action point in attracting students to the engineering areas is to show them that it does pay off to be an engineer. Not only in terms of economy capital but also when it comes to social or cultural capital.

• Each country has own characteristics and particular social, economic and political contexts, and therefore has different focus when analysing the labour market. The statistics from respective country has therefore to be compared with a little care.
Labour Market for Engineers

lessons learned

• There is a shortage of engineers in several fields. So the labour market look good for most countries.
Breakdown of unemployment rates among engineers (France)
IV. Engineers and Media
Engineers and Media

• We have to:
• create interesting stories – breaking news
• be more active outside the university
• show or act as role models
Final comments

To recruit more talent and motivated students to engineering education we need to:

• change the perceptions of engineers -> from a “xxx” to a social, open minded female/male engineer who leads the development to solve global problem for a better world

• encourage students interests for deep knowledge in technology fundamentals in parallel with personal and interpersonal skills.

• tell students that Engineering Education is demanding, fun and give pay back in terms of good job opportunities.

• get more Engineers as “stars” and “role models”.
Thank You