How to Create a New Generation of Talent?

An Industry-Academia View

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Discussion Points

- A View from Academia (TU Delft): Internationalization and Industry Involvement
- Recent Developments in Enrolment and Graduation
- A View from Industry (Schlumberger): Internationalization and Female Participation
Interests of the Main Players

- **Student:** Acquire skills that make him/her marketable in a field of his/her own interest; find a good job in an attractive company

- **Industry:** Recruit skilled but still malleable graduates at times of need

- **University:** Produce a steady stream of good graduates that help develop networks with industry and government
Divergences

• Industry wants to hire *when needed*, university wants to have ± constant influx of students and outflow of graduates

• Student wants to have *diploma and good grades*, university and industry wants *good skills*

• Upon entering university, student does not know market situation at time of graduation - often there is a *phase shift*
The University Market Place
European Developments

- Bologna Convention: B.Sc. and M.Sc. programs
- Erasmus Program: International Exchange
- European Science Foundation, EUROCORES
- Less national funding

♦ Collaboration AND Competition!
♦ Identify Opportunities
♦ Develop Vision, Identity and Image
The University Challenge: How to Adapt and Grow?

- Internationalization and competitive programmes
- Sponsorships
- Strategic alliances (U/U; U/I)
Internationalization: The Great Challenge

• M.Sc. program implies some degree of repetition with earlier curriculum, cross-disciplinary flow of students, courses in English, etc.

• Can universities become more international AND raise the standards?

• Recruiting hint: Those who can are the top universities
Internationalization

At the TU Delft more than 40% of the MSc students are international. The program is in English.
## Competitive Programmes

<table>
<thead>
<tr>
<th>Programme</th>
<th>Students (Dutch, Foreign)</th>
<th>Industry, PhD Leaves</th>
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<tbody>
<tr>
<td>BSc “Toegepaste Aardwetenschappen” (Applied Earth Sciences)</td>
<td>180 (all) Dutch</td>
<td>&lt; 5% leaves</td>
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<tr>
<td>Reservoir Geology</td>
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<td>Petroleum Engineering</td>
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<tr>
<td>MSc Applied Geophysics Jointly with ETH and RWTH</td>
<td>130 (60% Dutch, 40% foreign)</td>
<td>95% leaves to industry, 5% to PhD</td>
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<tr>
<td>MSc Geoscience and Petroleum Engineering</td>
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<tr>
<td>MSc Geo Engineering Jointly with Civil Engineering</td>
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<tr>
<td>MSc Resource Engineering EMC (Helsinki, RWTH, Exeter)</td>
<td>85 (80% foreign)</td>
<td>80% to industry</td>
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<tr>
<td>PhD Program</td>
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<td>Research School</td>
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<tr>
<td>Center for Technical Geosciences (CTG)</td>
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**Schlumberger**
Types of Sponsorships

• Endowments, donations (USA)
• Research grants
• Sponsoring chairs
• Scholarships for M.Sc. students
• Internships
M.Sc. Student Scholarships

- Establish link university - industry
- Bind student to sponsor
- Usually target student
- But recruiting does not always follow

M.Sc. level shortens “product cycle” to 2 years
Sponsorship: A Case Study

- NIOC sponsors 45 students to get M.Sc. in Petroleum Engineering in Europe
- Deal: Student completes study, gets job at NIOC
- Costs: ~40,000 Euros per student
- Selection within Iran from large number of applicants
- Distribute to three universities: Trondheim University, Imperial College London, Delft University of Technology
- Attrition rate ± zero; some students chose to pursue Ph.D.
- Motivated students, good results
- NIOC and universities achieved objectives
Strategic Alliances

• Goal: Establish strong link with one or more partners who share mutual or complementary interests

• Long term! Attract broad cross-section of students!

• Form 1: University Alliances (e.g. IDEA League, FEMP)

• Form 2: Industry-University Alliances (e.g. Schlumberger Ambassador Program, UTP etc)

• Need clear definitions of roles and responsibilities

• Can potentially reduce cyclic variations and uncertainties
FEMP

- Federation of European Mining Programs, an association of universities that do not have the critical mass for running such a program on their own; industry-cosponsored (Rio Tinto, Corus…) and EU supported
- **Mining Engineering**: Aachen, Exeter, Delft, Helsinki
- **Mineral Engineering**: Aachen, Exeter, Delft, Helsinki
- **Geotechnical and Environmental Engineering**: Berlin, Freiberg, Miskolc, Kosice, Wroclaw
- Worldwide unique and attractive; students cycle through universities, acquire international view and network, logistically demanding
- [www.femp.org](http://www.femp.org)
Recent Graduation Comparisons

First university natural sciences and engineering degrees, by selected countries: 1999–2008

Thousands

- China
- United States
- Japan
- South Korea
- Germany
- United Kingdom

Natural sciences and engineering doctoral degrees, by selected country: 2000–08

Thousands

- China
- United States
- Germany
- Russia
- India
- UK
- Japan
- South Korea

Science and Engineering Indicators 2012
Fig. 1—Number of US petroleum engineering degrees granted since 1993.
First Year Enrollment
Applied Earth Science, TU Delft

Projected for 2013: 120
Female Percentage is 25% on Average
BSc Engineering Degrees, USA

Number of Bachelor’s Degrees awarded in Engineering Fields, by Gender (2000-2008)
(source: National Science Foundation)

- Both
- Female
- Male

Year
1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009
Number of Degrees
0 10,000 20,000 30,000 40,000 50,000 60,000 70,000 80,000
Schlumberger’s Internationalization

• Schlumberger started in the 1980’s to become a truly international company, hiring people from throughout the world (“company match”)

• This required a serious change in the company culture as a much more diverse workforce required different ethics standards, mutual understanding, tolerance and respect.

• 30 years later Schlumberger has a workforce of 120,000+ from over 100 countries
Schlumberger’s Internationalization
Schlumberger’s Next Initiative

- More recently Schlumberger has actively pursued to increase the percentage of women in the company at all levels and in all fields
- Today the head of Wireline is a woman and until recently the head of DCS as well
Schlumberger’s Next Initiative

A female SLB wireline engineer on OMV’s well Spannberg-29 (2007)
Schlumberger’s Next Initiative

• Schlumberger in 2004 has taken the next step with the Schlumberger Foundation Faculty for the Future (FFTF)

• This program provides funding to women from emerging countries to pursue an advanced graduate study abroad in science, engineering and technology.

• The long-term goal of the Faculty for the Future program is to generate conditions that result in more women pursuing scientific and engineering disciplines, and helping their societies implement change leading to increased prosperity and economic development.
Schlumberger’s Next Initiative

- For the academic year 2013-2014 67 women have received a scholarship from the FFTF programme
- Most of them are from Asian and African countries
The FFTF’s Success Rate is Monitored

Current employment status of former fellows

- Academic
- Post Doc
- PhD
- Industry
- Unemployed

- Not at home
- At home