

# Quality Management in the University Value-Chain

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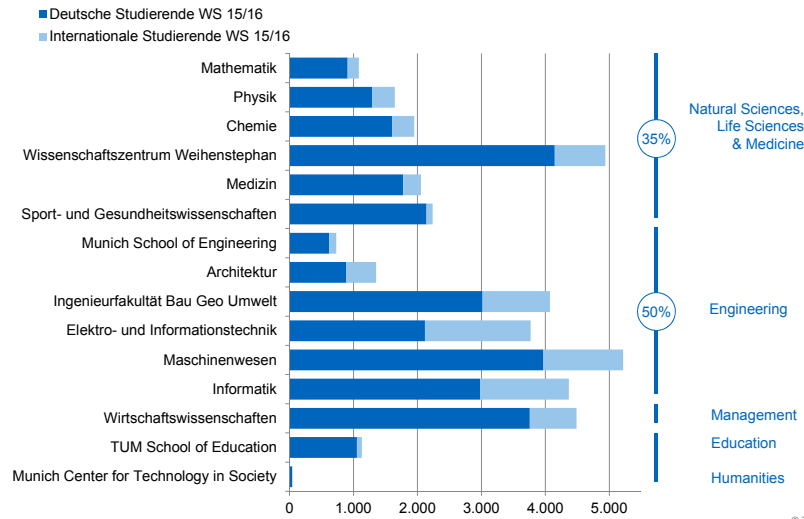
## TUM Facts & Figures

- 13 Departments
- 390 Buildings
- 165 Degree Courses
- ~ 39 000 Students, 34% female, 22% internat'l
- ~ 12 600 Freshman Students
- 8 200 Graduates per year
- > 1 000 PhD Theses per year
- ~ 5 000 Publications, peer-reviewed per year
- 528 Professors (incl. hospital), 17% female, 16% internat'l
- ~ 6 200 Scientific Staff (incl. hospital)
- ~ 3 200 Non-Scientific Staff (not incl. hospital)
- 47 ERC Grants (since 2008)
- 49 Humboldt Senior Research Fellows (2010-14)
- 13 Nobel Prize Laureates
- 18 Leibniz Laureates (DFG)
- 5 Humboldt Professors
- > 1 000 Research Agreements with industry p. a.

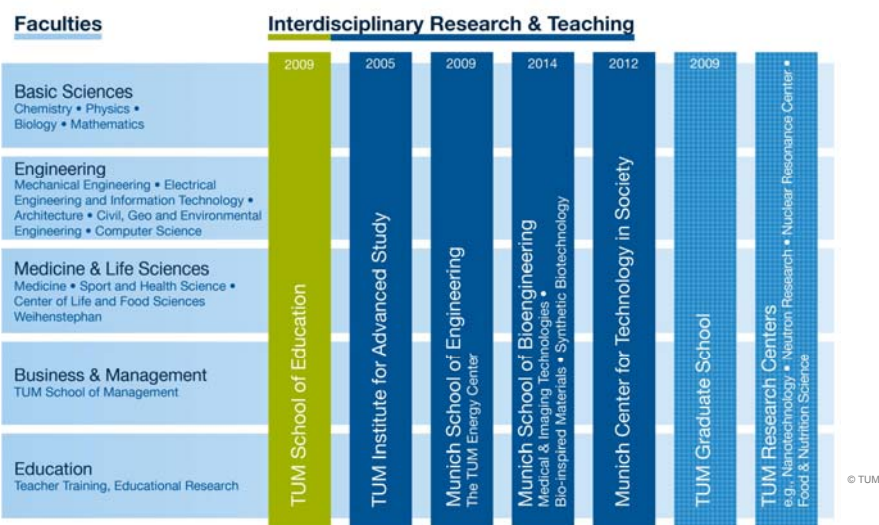


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## TUM Students



## TUM Core Competencies and Interdisciplinarity



## Overview

- Technical University of Munich
- QM Factors in Value Chain Processes
- Observations, Challenges, Surprises

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## Overview

- Technical University of Munich
- QM Factors in Value Chain Processes
  - University
  - Departments
  - Faculty
  - Degree Programs
  - Modules
- Observations, Challenges, Surprises

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## Areas of Quality Management

### University Strategy

#### Topics, Approaches

- Social responsibility
- University development plan
- Future orientation
- Departmental specialization/key fields of research
- TUM Board of Management
- TUM Extended Board of Management
- TUM Board of Trustees
- TUM Senate
- TUM University Council
- Evaluation of the institutional strategy

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## TUM Excellence Initiative 2012-2017

### Institutional Strategy

#### TUM. The Entrepreneurial University.

- TUM Faculty Tenure Track
- Integrative Research Centers
- Entrepreneurial University Development
- TUM.Family
- TUM.Global

*The Entrepreneurial University.*

### Excellence Cluster

- Origin and Structure of the Universe (TUM- Sprecherschaft)
- Center for Integrated Protein Science (CIPSM)
- Munich Center for Advanced Photonics (MAP)
- Nanosystems Initiative Munich (NIM)
- Munich Cluster for Systems Neurology (SyNergy)

SyNergy  
Munich Cluster for Systems Neurology



### Graduate School

#### International Graduate School of Science and Engineering

- Bridge between Science and Engineering
- Structured Doctoral Education
- Transferable Skills Training



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## Areas of Quality Management

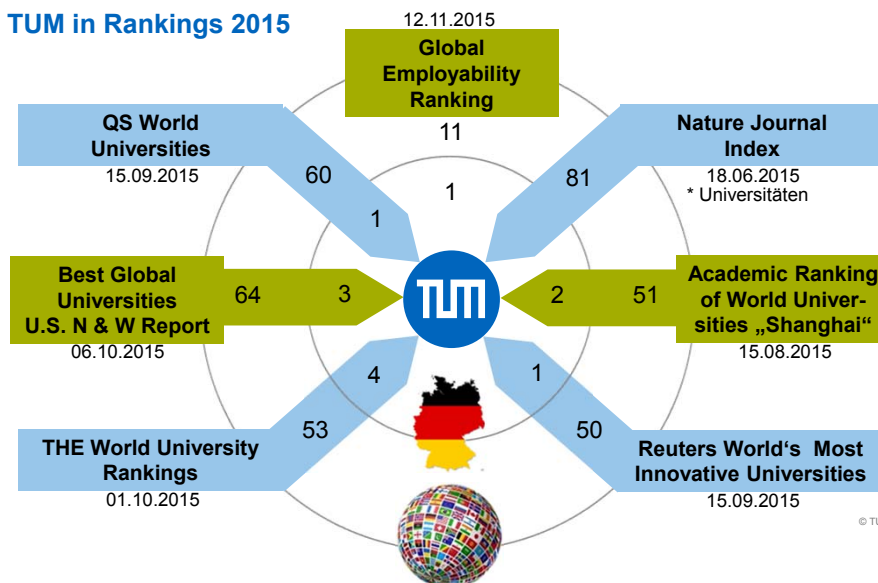
### University Strategy

#### Topics, Approaches

- Social responsibility
- University development plan
- Future orientation
- Departmental specialization/key fields of research
- TUM Board of Management
- TUM Extended Board of Management
- TUM Board of Trustees
- TUM Senate
- TUM University Council
- Evaluation of the institutional strategy
- Evaluation of departments
- Rankings

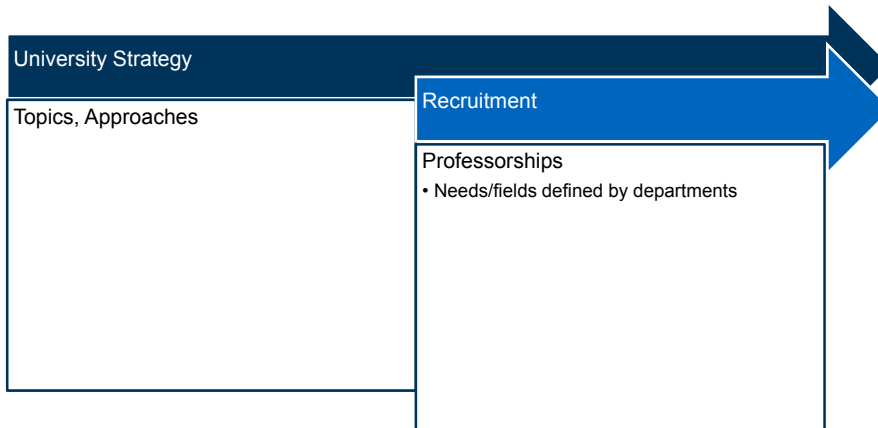
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## TUM in Rankings 2015



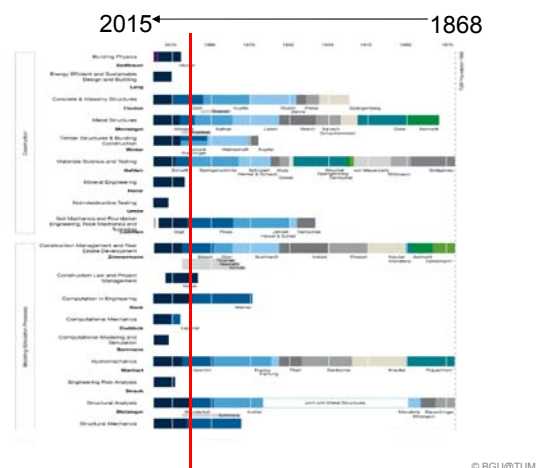
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## Areas of Quality Management



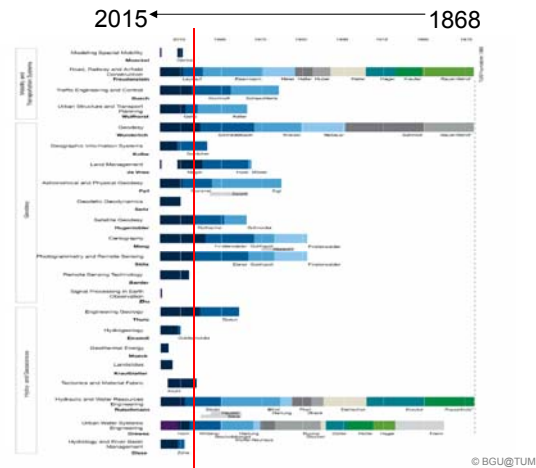
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## New Challenges, New Fields...



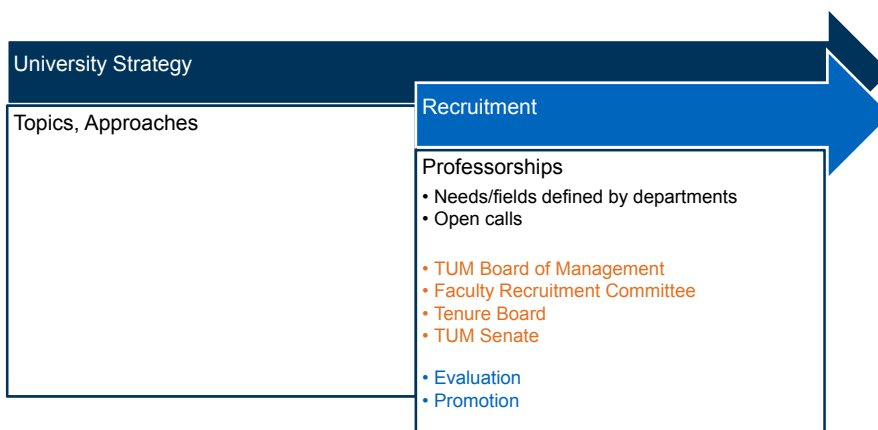
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## New Challenges, New Fields...



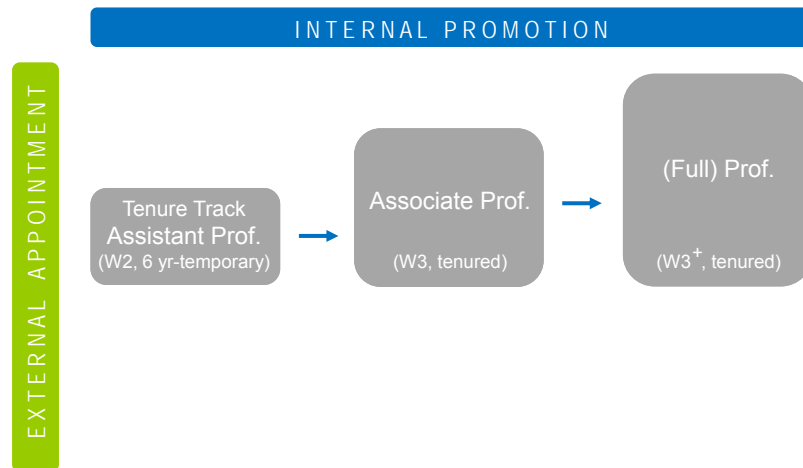
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## Areas of Quality Management



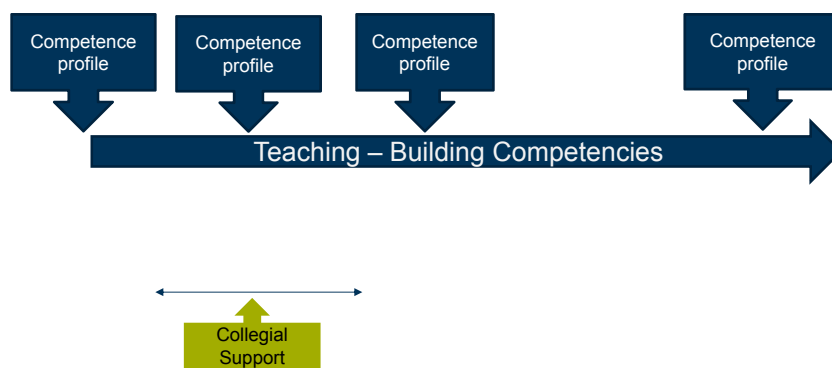
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## TUM Faculty Recruitment and Career System



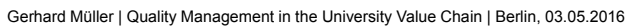
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## Talent Management – Professors

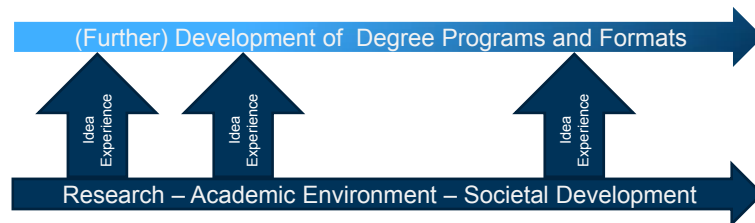


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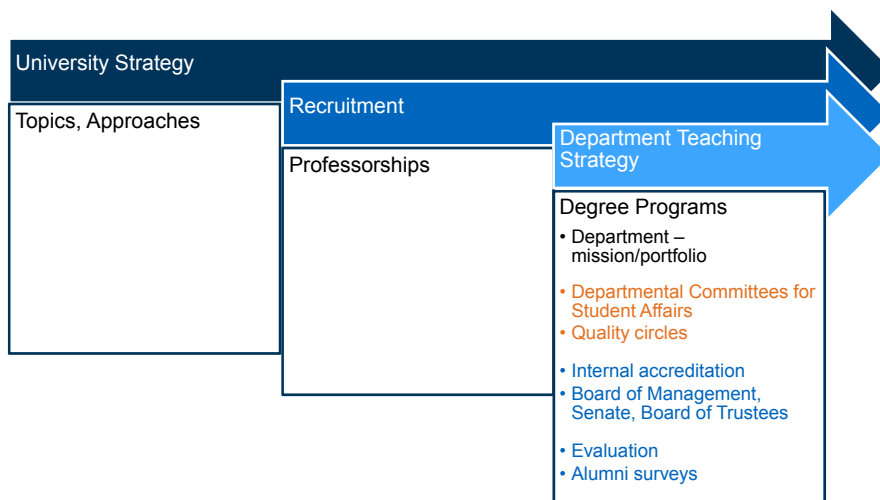
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## Talent Management – Professors



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## Areas of Quality Mangement



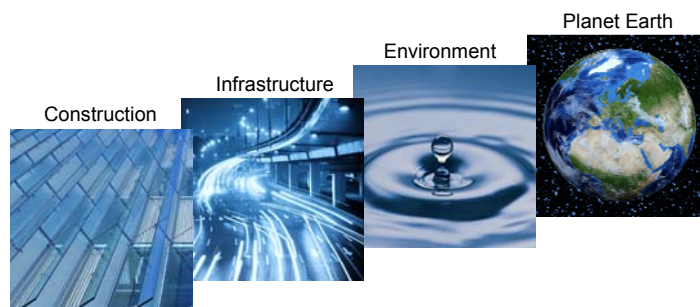
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## Department Strategy

### TUM Department of Civil, Geo and Environmental Engineering

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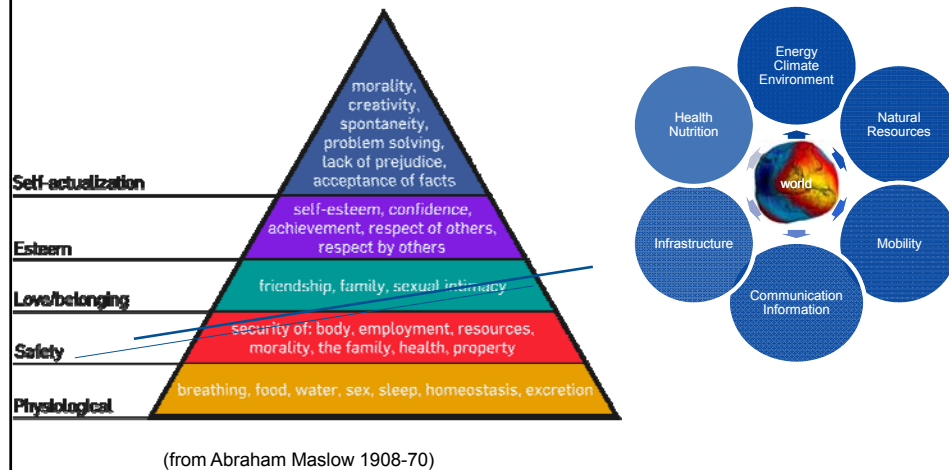
## Department's Guiding Principle - a touchstone for strategic decisions



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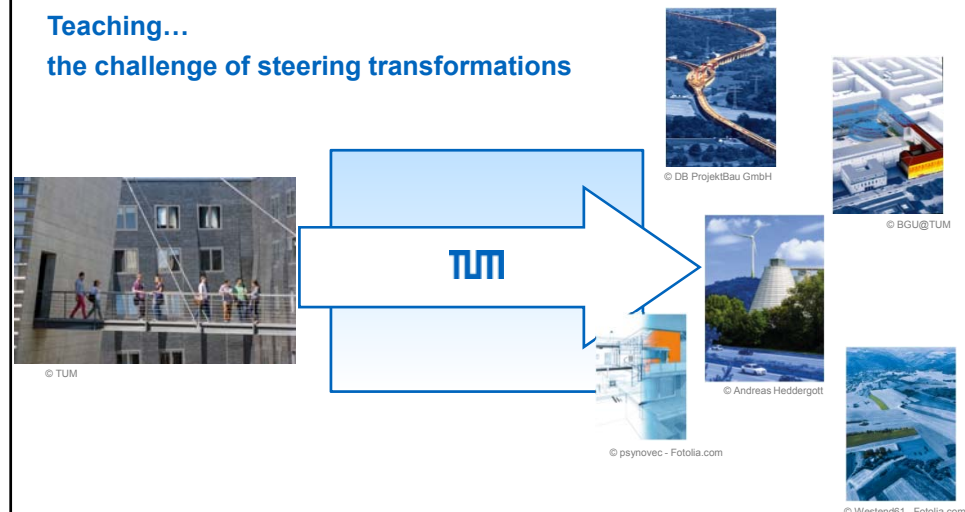
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## Guiding Principle – Mission, Societal Challenges



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## Teaching... the challenge of steering transformations



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## Challenges / needs

Society needs...

- ... **planners, designers and operators** of the built and natural environment and its resources
- ... **innovators and integrators** of ideas and technologies across the public, private and academic sectors



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## Challenges / needs

Society needs...

- ... **managers of risk and uncertainty**, not just caused by natural events, accidents and other threats
- ... **leaders in discussions and decisions**, shaping public environmental and infrastructure policy



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### Civil/Geo/Environmental Engineers...

- ...employ **models** to describe elements of reality relevant to the **problems they confront**.
- ...research the contexts and interrelated factors relevant to these models through **observation and the methods of the natural, economic, human and social sciences**, as well as other branches of the sciences.
- ...prepare this material accordingly using **various means of description and specification**, such as mathematical formulas, numerical and physical experiments, systematically documented observation on numerous different scales, etc.
- ...

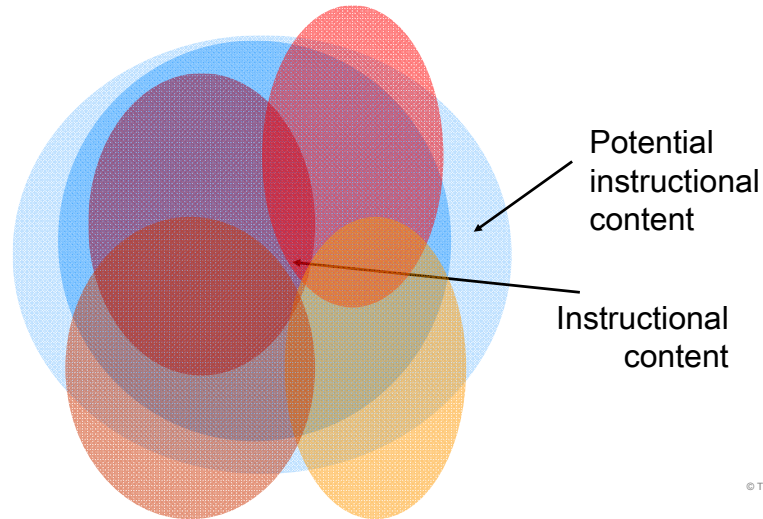
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### Structured Processes in Departments

- Guiding principle, mission
- **Systematizing teaching content**
- **Continued development of old and development of new professional profiles**

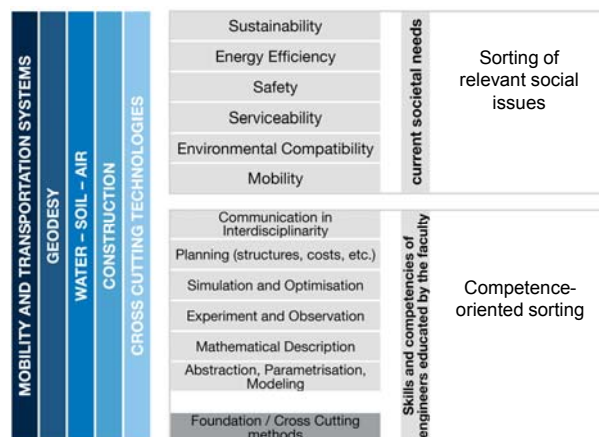
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## Systematization



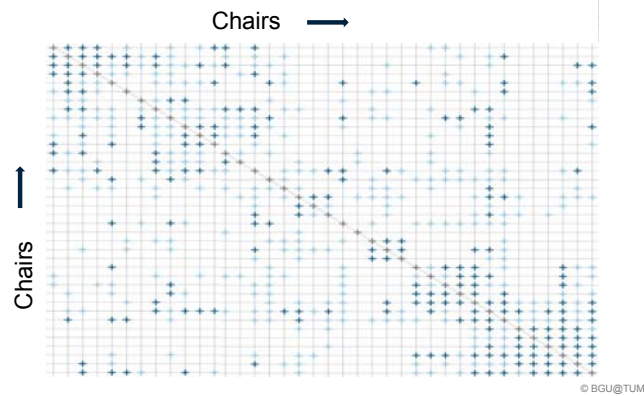
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## Target Groups – New Occupational Profiles



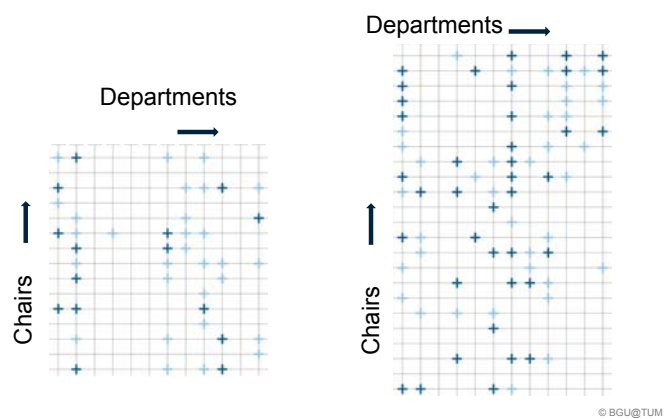
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## Facing Challenges...Cooperation within the Department



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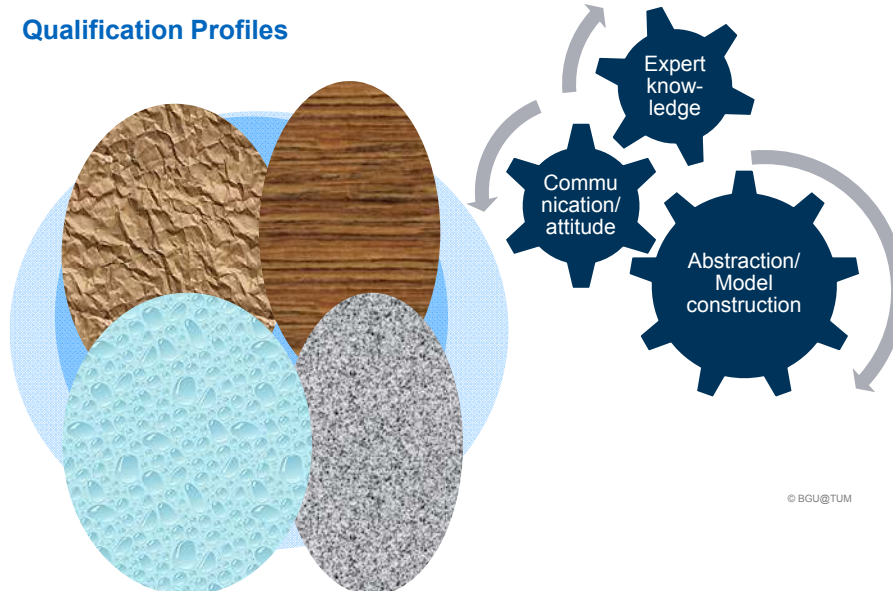
## Facing Challenges...Cooperation within the University



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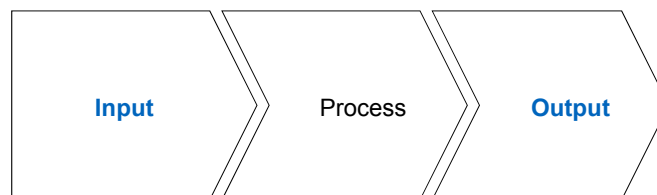


## Qualification Profiles

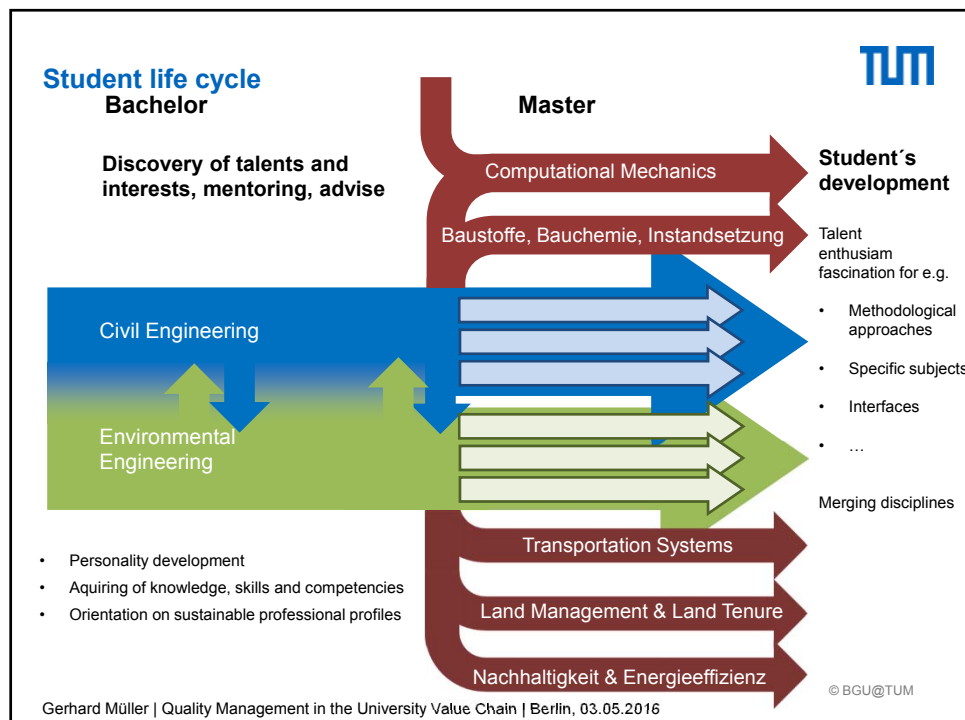
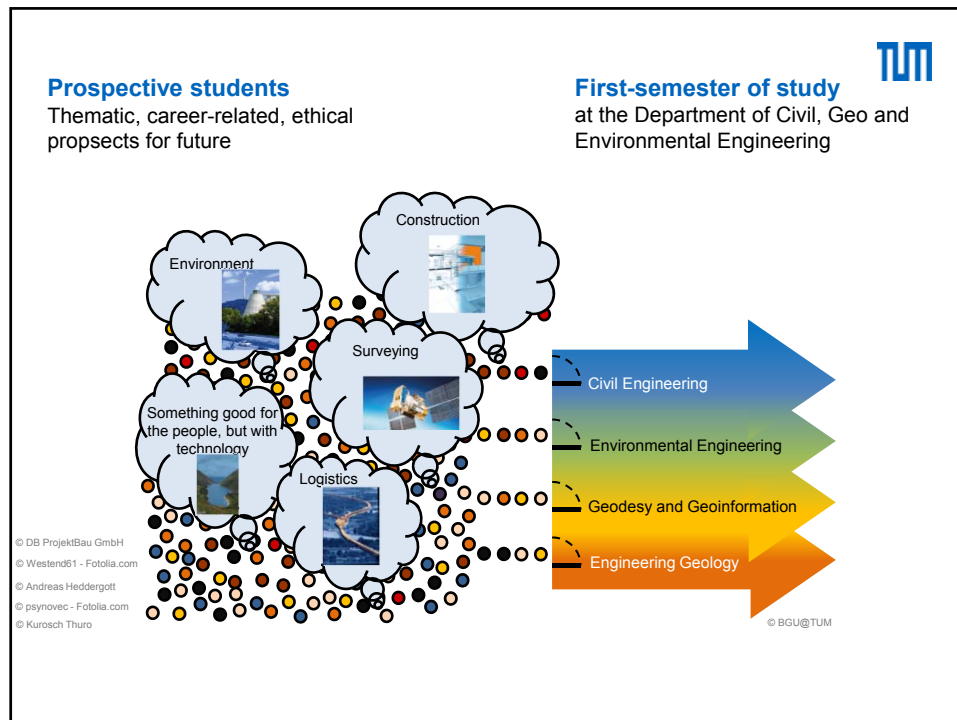


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## Value-Chain Process



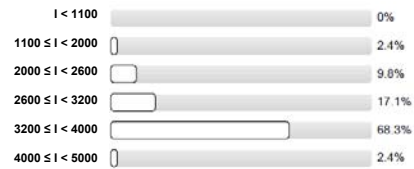
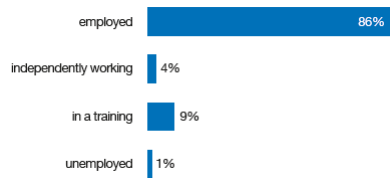
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## Interface output, Alumni Survey (2007 - 2013)

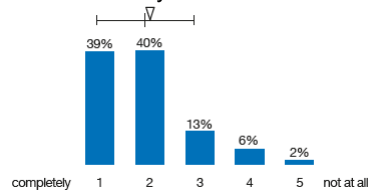
**Response: 30 %**

**Rate of Employment: 99 %**



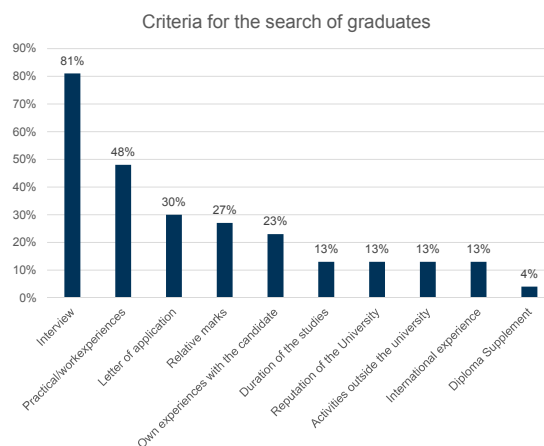
ca. 70 % earn between 3200 EUR and 5000 EUR/month

Employment according to field of study



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## Interface output



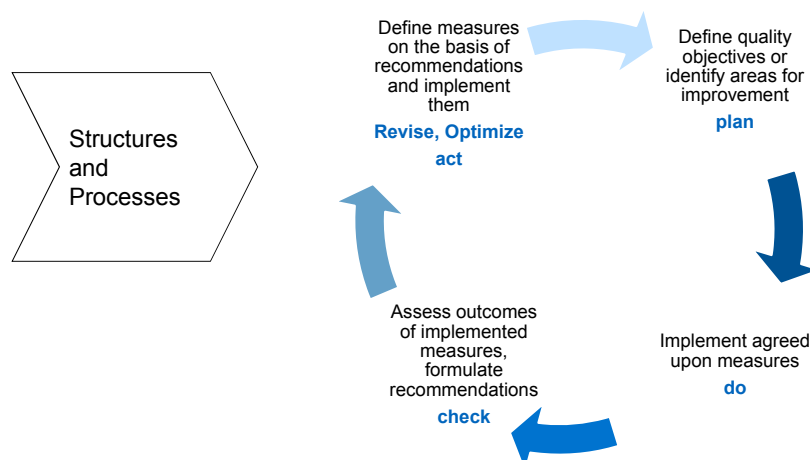
Source: 15 Jahre Bolognaform, Quo vadis Ingenieurausbildung, VDI, Stiftung Mercator, VDMA

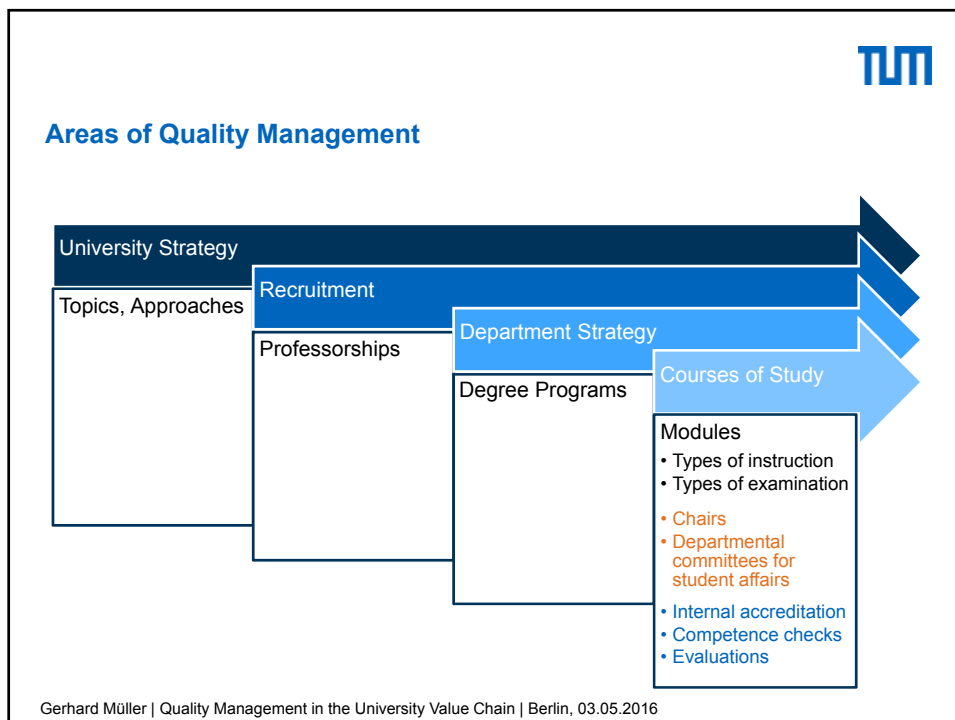
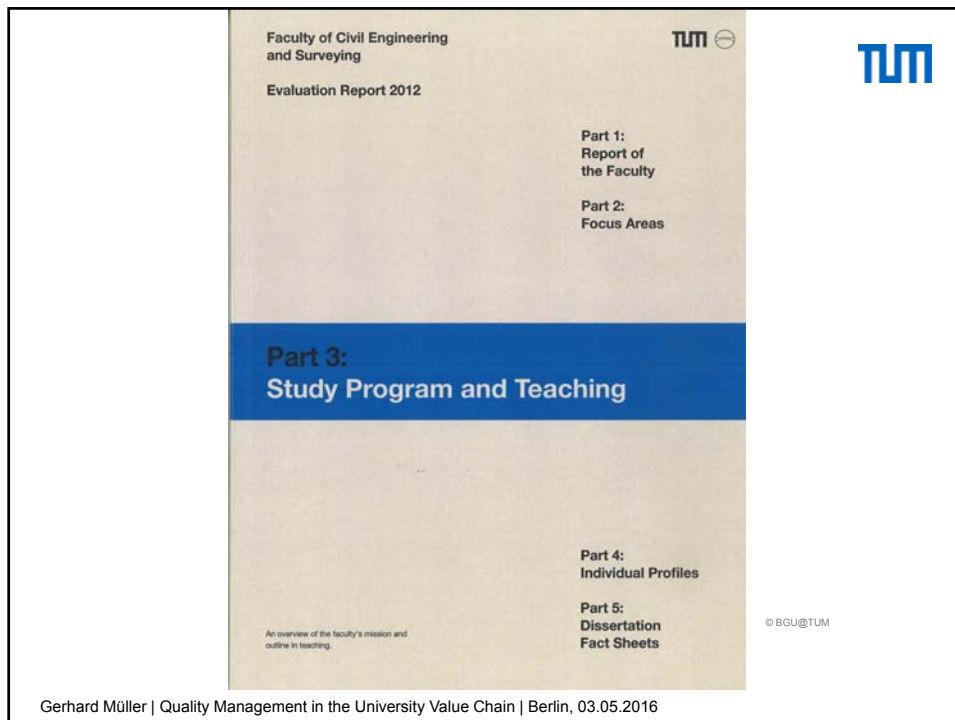
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## Relationships to Practice: Cooperative Trainee Programs

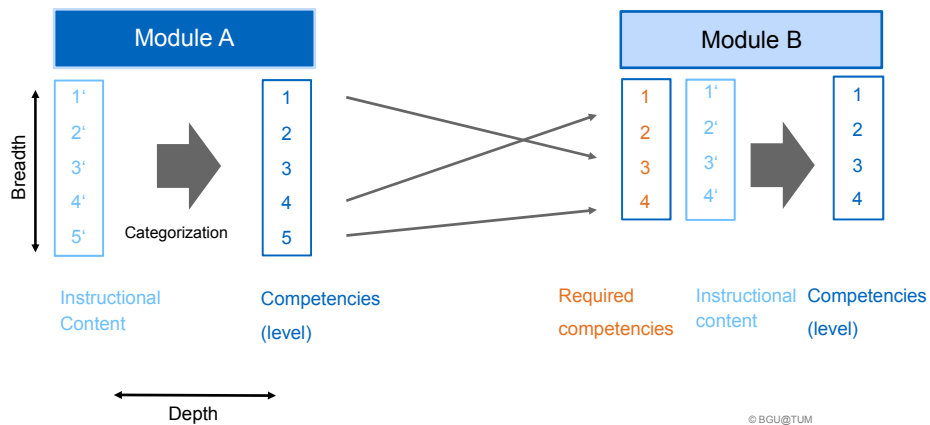
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## Quality Management, Degree Program Life Cycle





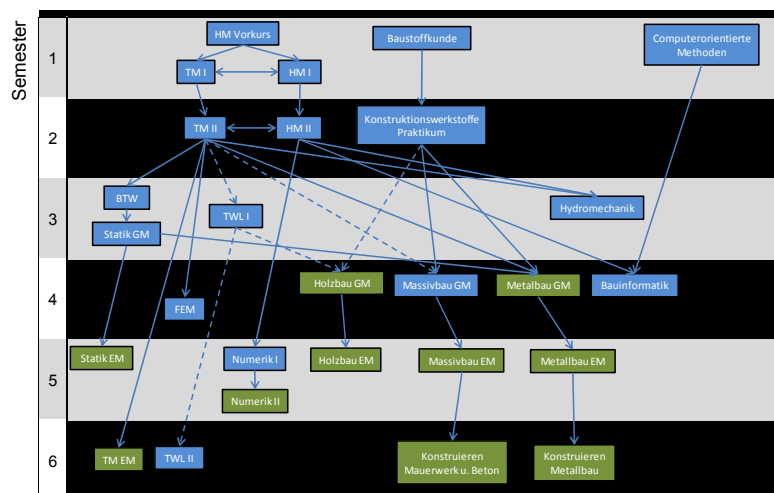
## Defining Points of Intersection



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## Integrative Planning

Bachelor's in Civil Engineering



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## Overview

- Technical University of Munich
- QM Factors in Value Chain Processes
- Preparing for Institutional Accreditation
- **Observations, Challenges, Surprises**

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## Challenges - Surprises

Subsidiary system leads universities to

- Different disciplinary cultures, different “languages”, different ways of thinking, with communication barriers
- Individual solutions that evolved into “lifeblood” areas
- “Islands” of personnel, kingdoms
- **Liberation from unnecessary individual solutions**

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### Challenges – Surprises, 2

- Communication: The solution is neither “everything was better in the old days” nor “now we know better what is necessary for quality”
- Transparence and discretion
- **Respect**
- **Instruments designed for purpose**

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### Challenges – Surprises, 3

- Gradual withdrawal of stakeholders, shift of responsibilities
- Learn to think from the “bottom-up”
- **Discussion and defense**

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## Challenges – Surprises, 4

- Avoid unnecessary constrictive chains, focus on reasonable guidelines that enable a structured development
- It is advisable to clearly separate national, regional and personal normative frames of reference
- Avoid misunderstandings
- **Communication and transparency**

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## Observations

- The process of documentation is extremely helpful (and fosters identification, as well)
- Moderated discussion in the scope of departmental evaluations and in the Extended Board of Management leads (automatically) to:
  - improved interdisciplinarity
  - new overarching profiles
  - better understanding

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## Observations, 2

- The process of quality management, of systematizing instructional content, and of discussion of competence-oriented teaching leads to:
  - critical examination of current formats
  - identification of redundancies
  - taking up the variety of motivations and talents
  - enhanced and new forms of instruction
  - clear coupling points between the competencies acquired in secondary schools and, later, in the practiced profession
- **Not the accreditation but the quality management system is in the focus**

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