Rheinisch-Westfälische Technische Hochschule Aachen

Harmonisation of the Degrees
or
Creating Transnational Transparency of Qualification Profiles

Werner Weber
Dipl.-Ing., Akad. Direktor

RWTH International Relations Office

Castellón 16 May 2003

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- in four steps
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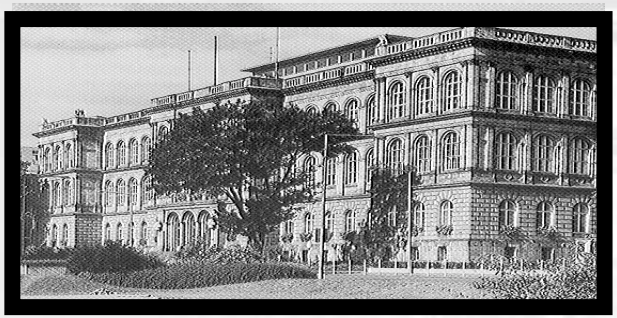
The *Politechnikum*



Founded: 1870

Rheinisch - Westfälische Technische Hochschule

(The Nordrhein-Westfalen State Institute of Technology)

Re-established: 1948

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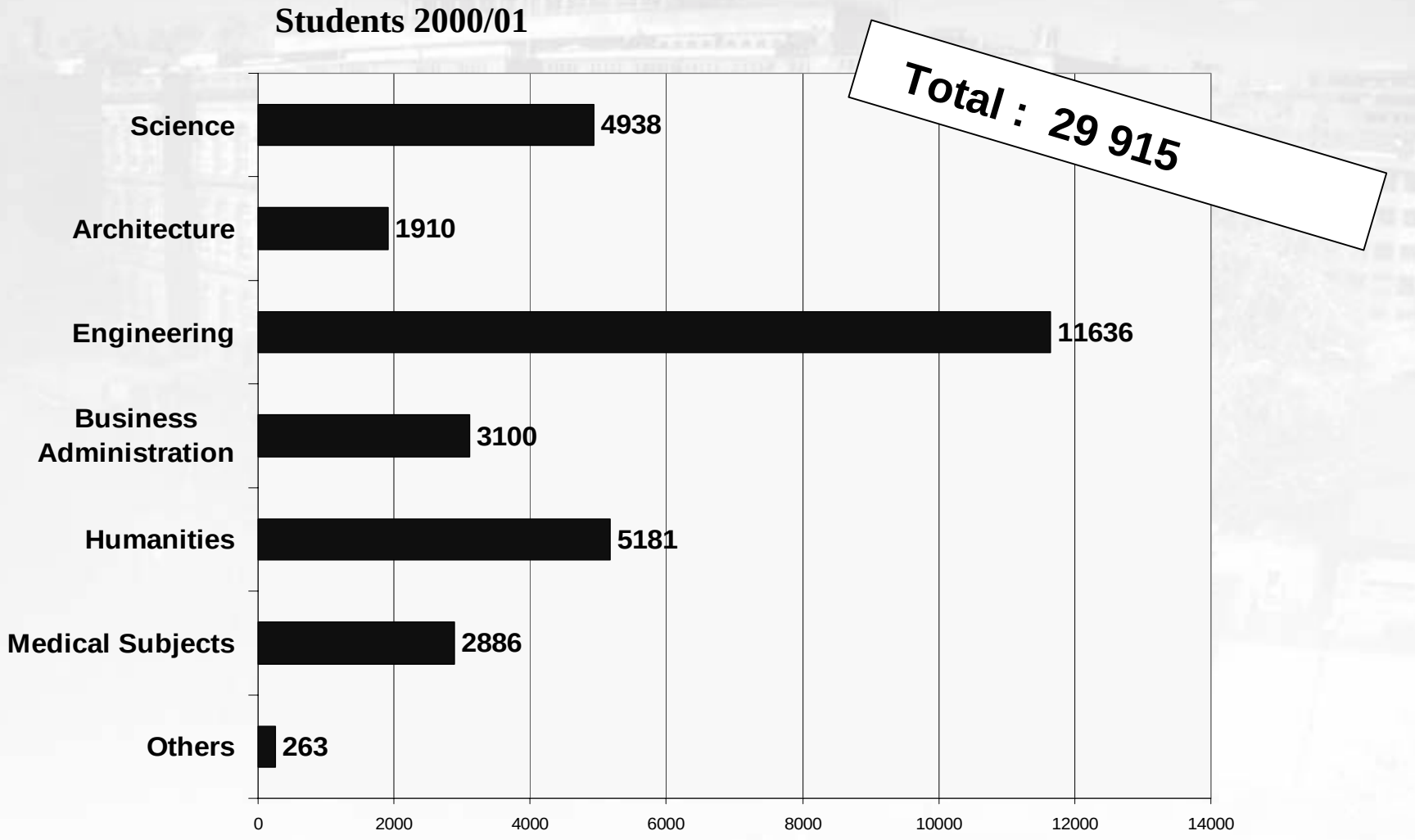
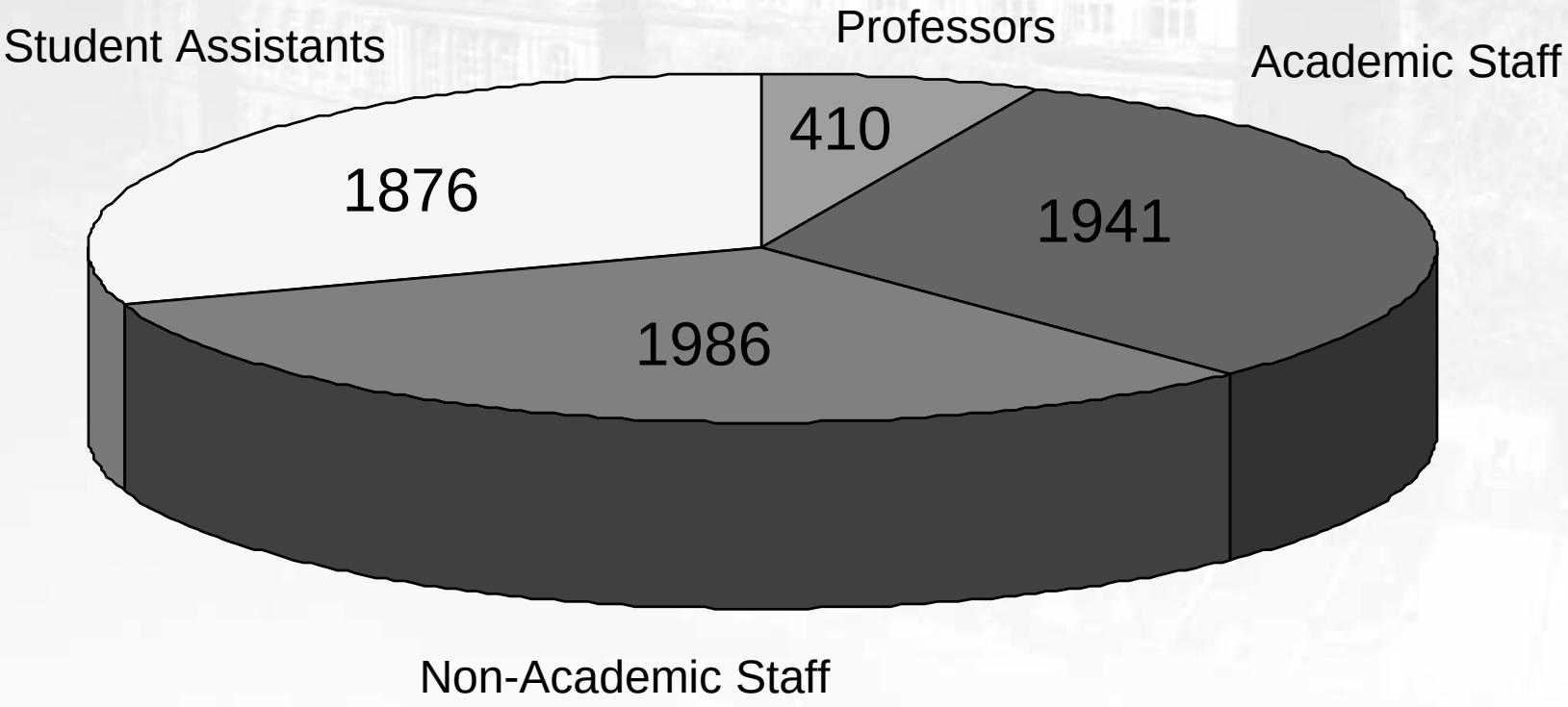
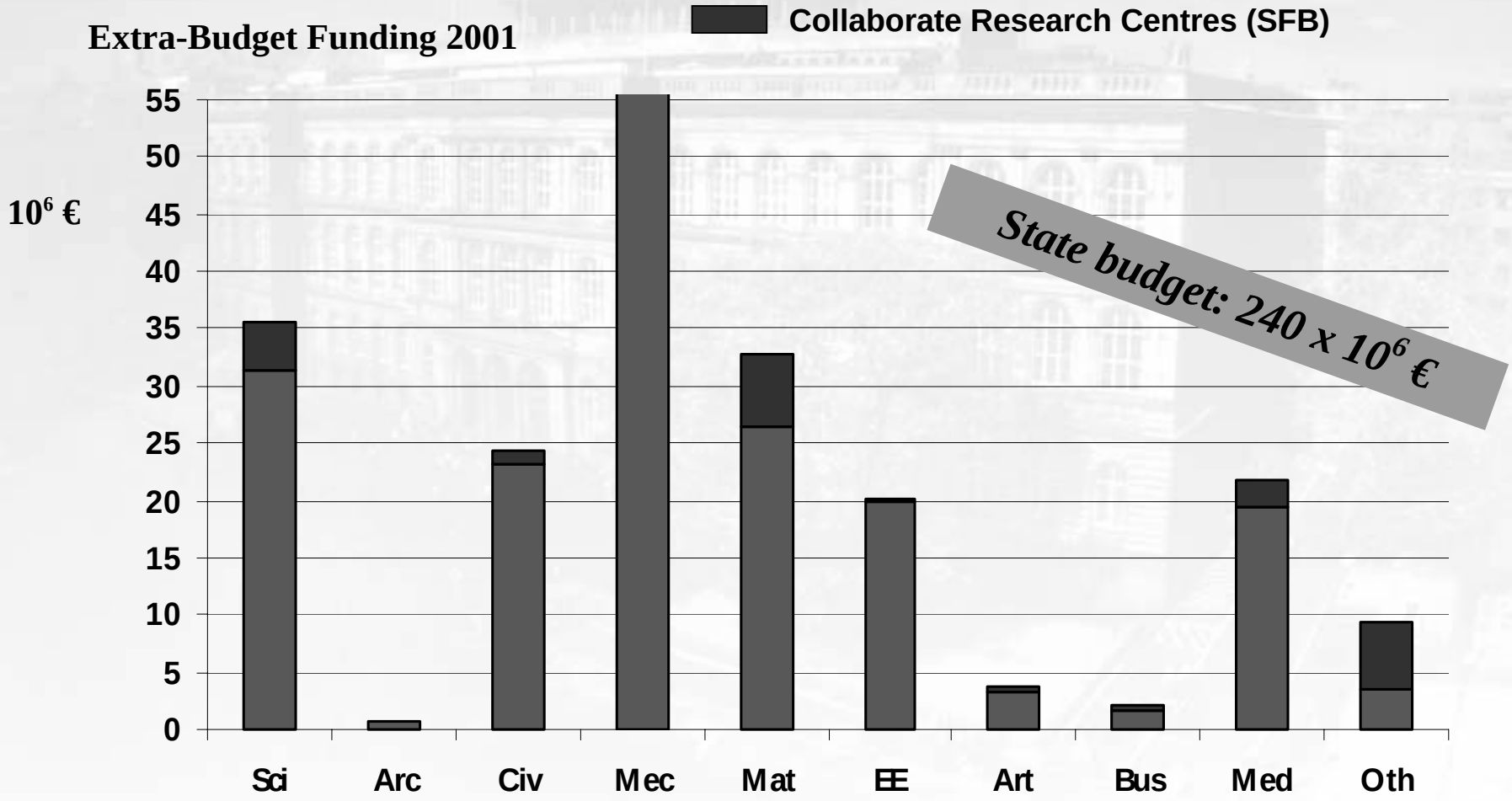
Transnational Transparency of Qualification Profiles



Staff 2001


Student Assistants
Professors
Academic Staff
1876
410
1941
1986
Non-Academic Staff

Transnational Transparency of Qualification Profiles



Transnational Transparency of Qualification Profiles

IDEA League

leading European education and research in science and technology

Imperial College
OF SCIENCE, TECHNOLOGY AND MEDICINE

TU Delft
Delft University of Technology

ETH Zürich

RHEINISCH-WESTFÄLISCHE TECHNISCHE HOCHSCHULE
RWTH AACHEN

- ***Cooperative approach to quality***
- ***Common methodology of quality assurance***
- ***Political visibility of European top TU***

The European dilemma

Diversity of systems and degrees:

- ***How to assure europe-wide accessible and reliable information about the competencies which students have acquired in a study programme?***

Interest of employers , students, the public, the universities

Sorbonne Declaration 25 May 1998

- ***Harmonisation of the architecture of the EU HE System***
- ***International recognition of degrees***
- ***Mobility of students and research staff***
- ***Employability***
- ***Progressive Harmonisation of degrees and cycles through joint activities and dialogue of the HE providers***

Problems

- ***Numerous and diverse designations of degrees***
- ***Standards exist only on national level***
- ***Standards fix the minimum; quality beyond standard is invisible***
- ***Diversity of the understanding of educational quality***
- ***Different mechanisms for the assurance of the quality of qualifications***

Bologna: no solution

- ***Bologna requires interpretation***

- ***Diversity in terms of degrees has increased***

The Bologna situation in Germany (1)

Structural Conditions for Bachelor/Master Study Programmes
Resolution of the Standing Conference of Ministers of Education (KMK)
in Germany of 5 March 1999

The regular duration of **Bachelor** study programmes is according to the HRG § 19 section **2 to 5 three (minimum) to four (maximum) years**, of Master study programmes **one (minimum) to two (maximum) years**. Consecutive Bachelor/Master study programmes must not exceed a regular duration of five years.

1.1 First degree **programmes leading straight to** a **Masters** degree are therefore **prohibited.**

The **Bachelor** is an independent **professionally qualifying** degree.

there is a **need to differentiate** between degrees achieved through **more theory orientated study programmes** and degrees achieved through **more application orientated study programmes**

The Bologna situation in Germany (2)

Subject area groups	Designation of final degrees
1. More theory orientated study programmes	
Mathematics, Science Medicine Veterinary Medicine Agricultural Science, Forestry Science, Food Science Engineering	B.Sc. (Bachelor of Science/Bakkalaureus Scientiarum) M.Sc. (Master of Science/Magister Scientiarum)
2. More application orientated study programmes	
Engineering	Bachelor/Master of Engineering

The Bologna situation in Germany (3)*

- **Bachelor programmes: 665**
- **Master programmes: 803**
- **13% of all study programmes / 2 % of students**
- **replacement of Diplom system by B/M system intended by 7 % of FH, 6 % of TU**

*** as reported by DAAD according to an investigation of CHEPS/CHE Oct 2002**
http://www.hrk.de/downloads/21112002/grothus.pdf

The Bologna situation in Germany (4)*

- **Bachelor at FH = Qualification relevant to the labour market**
- **Bachelor at U = Academic interface for horizontal mobility**
- **Bachelor and Master programmes accredited: 12%**

*** As reported by DAAD according to an investigation of CHEPS/CHE Oct 2002**
http://www.hrk.de/downloads/21112002/grothus.pdf

B / M in Europe (CESAER)

- P Milano (I): B (3y) + M (2y)
- ECP (F): 2y+3y (traditional G.E. system) > diplome
- TU Delft (NL): virtual bachelor (3y) > MSc (5y)
- Imperial C (UK): MEng (4y) replaces BEng (3y) & MSc (1y)
- RWTH (D): Dipl.-Ing. (5y) & International Master (2y)

Towards Transparency in 4 Steps

1. Definition (H3E, IDEA):
   Qualification Profile = Set of Compentencies (Qualification Attributes) acquired at Graduation

2. Qualification Profile = Objectives of a study programme

3. Quality Assurance = Guarantee that the objectives of a study programme are achieved

4. Documentation and europe-wide publication of the objectives of the various engineering study programmes in form of quality assured qualification profiles

Implementation

Step 1:
Introduction of the term "*Qualification Profile*" into the terminology and methodology of the organisations and institutions which determine engineering education (professional organisations, accreditation agencies, ministries, universities, departments)

Implementation

Step 2:
Adaptation of study and assessment regulations
(objectives = qualification profile)

Implementation

Step 3: Re-orientation of Accreditation:
Accreditation confirms nothing but the fact that a study programme truly generates the qualification profile of the graduates as fixed in its objectives
- see ABET 2000

Implementation

Step 4: Publication

a) diploma supplement **= Documentation of the qualification profile of the graduates as promised (guaranteed) by the provider**

b) The European Data Base Quality Approved Engineering Qualifications
Listing of study programmes and degrees with their quality assured qualification profiles

QP examples (1)

Euro Record

Code	*Competence heading*	*Description*
A	**REFLECTION AND SELF-AWARENESS**	
A1	**Understanding the nature of knowledge and competence**	***Understand the qualities of different kinds of knowing, understanding, know-how, values, skills and competences and how they inter-relate and reinforce each other***

QP examples (2)

Euro Record

B	**ETHICS, PRINCIPLES AND VALUES**	
B1	**Follow an accepted code of ethics**	
B1.1	**Consideration of ethical issues and values**	***Incorporate into judgements consideration of ethical issues, values and the role of the profession in society***
B1.2	**Commitment to own profession**	***Act to uphold the honour, integrity and dignity of the profession, demonstrating commitment to positive development of the profession, for the benefit of the wider community***

QP examples (3)

Euro Record

D	**GENERIC ENGINEERING COMPETENCES, common to all professional engineers**	
D1	**Professional engineering practice**	
D1.1	**Solve engineering problems**	***Solve engineering problems***
D1.1.1	**Exercise original thought...**	***Exercise original thought in synthesising satisfactory outcomes to engineering challenges***
D1.1.2	**Exercise professional judgement...**	***Exercise professional judgement in making engineering decisions***
D1.1.3	**Work of a creative and innovative nature...**	***Undertake work of a creative and innovative nature***

QP examples (4)

Euro Record

E3.3	**Process operations, control and optimisation**	***Perform process operations, control and optimisation tasks***
E3.3.1	**Process operations and control improvements...**	***Refine and optimise process operations and control***
E3.3.2	**Process operations and control...**	***Perform process operations and control tasks***
E3.3.3	**Value analysis...**	***Perform value analysis tasks***
E3.3.4	**Manufacturing or process problem solving...**	***Perform tasks to diagnose and resolve manufacturing or process problems***

QP examples (5)

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Guidelines for establishing a qualification profile for the *Bachelor's* degree

A. General skills and attributes

Students with a Bachelor diploma will

1. have an ability to deploy accurately established techniques of analysis and enquiry within their discipline.
2. be able to critically evaluate arguments, assumptions, abstract concepts and data, in order to make judgments and to contribute to solutions of complex issues.
3. have conceptual understanding of some aspects of research in their field of study and have the ability to describe and comment upon its implications.
4. be able to apply the methods and techniques that they have learned to review, consolidate, extend and apply their knowledge and understanding, to solve problems and to carry out projects.
5. be able to work in a team.
6. …..

QP examples (6)

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…. qualification profile for the *Bachelor's* degree

B. Domain specific and subject-specific skills and competences include:

1. systematic understanding of key aspects of their field of study,
2. basic knowledge of methods and technical practice in their field of study,
3. initial training in theoretical knowledge and methods in research and modelling,
4. basic knowledge of their field of study and the cohesion between the specific subject areas within that domain,
5. specific attitude and way of thinking expected in a particular subject,
6. awareness of connections with other disciplines.

QP examples (7)

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Guidelines for establishing a qualification profile for the *Master's* degree

Graduates will

1. be capable of being analytical in their work on the basis of a broad and deep scientific knowledge.
2. be able to synthesise knowledge and to solve problems in a creative way dealing with complex issues.
3. have the qualities needed for employment in circumstances requiring sound judgement, personal responsibility and initiative, in complex and unpredictable professional environments.
4. be able to assume leading roles, including management roles, in companies and research organisations, and be able to contribute to innovation.
5. be able to work in an international environment, helped by their social and cultural sensitivity and language and communication abilities, partly acquired through experience of team work and any study periods abroad.
6. …..
7. ….

Advantages of the Transparency System

- Diversity of curricula and degrees to be maintained > not deficiency, but wealth
- Competition of the autonomous engineering education providers
- Internal quality assurance
- Facilitation of accreditation procedures (Reduction of costs, increase of acceptance)
- Limitation of the administrative efforts for the provision of the diploma supplement
- The approved qualification profile as an argument in the framework of world-wide marketing of engineering education programmes

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