Benchmark: Maths, Science and Technology
Berlin, 18th April 2007

Dr. Barbara Hartung

Ministry of Science and Culture of Lower Saxony

Prof. Barbara Schwarze

Competence Centre Technology-Diversity-Equal Chances

We need qualified (young) talents in technology and IT!

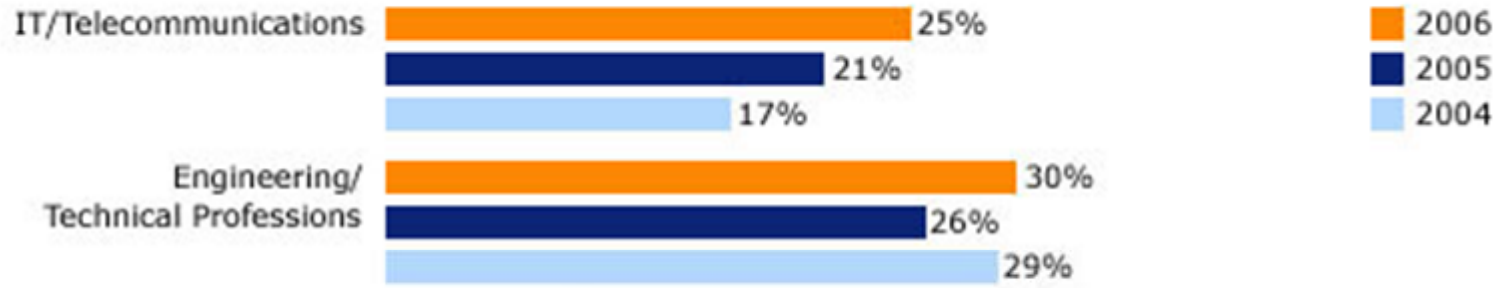
Labourmarket: There is a europeanwide lack of engineers and IT-specialists, which is even worse for Germany, as the StepStone-study „Recruitment Trends 2006“ points out.

Companies which can not find the engineers or IT-Specialists needed look for qualified mathematicians or physicists to fill in the gap.

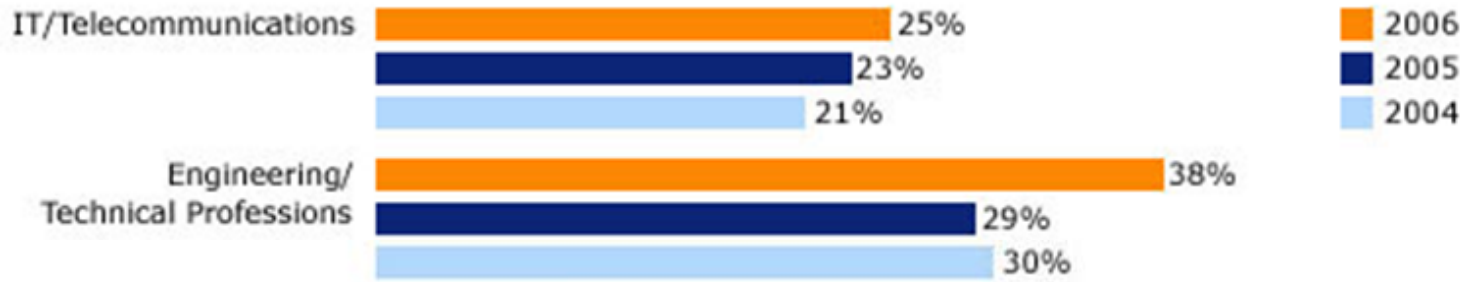
Quelle:http://www.it-jobs.stepstone.de/content/de/de/B2C_Mangelware_IT_ING_PM.cfm

Massive Lack of qualified engineers and IT-specialists

Europe



Germany



Quelle:http://www.it-jobs.stepstone.de/content/de/de/B2C_Mangelware_IT_ING_PM.cfm

We need mathematicians!

An Information and Knowledge Society needs mathematicians: A growing market for so-called intelligent products is based on mathematics.

A lot of the technical devices we use in our daily life have mathematics inside: computer and camera hard- und software, DVD and CD-Players, stock-exchange prices, election forecasts, medicine-technology and many more.

Mathematicians are really needed in Germany today, especially applied mathematicians. Mathematics are the basis of engineering studies.

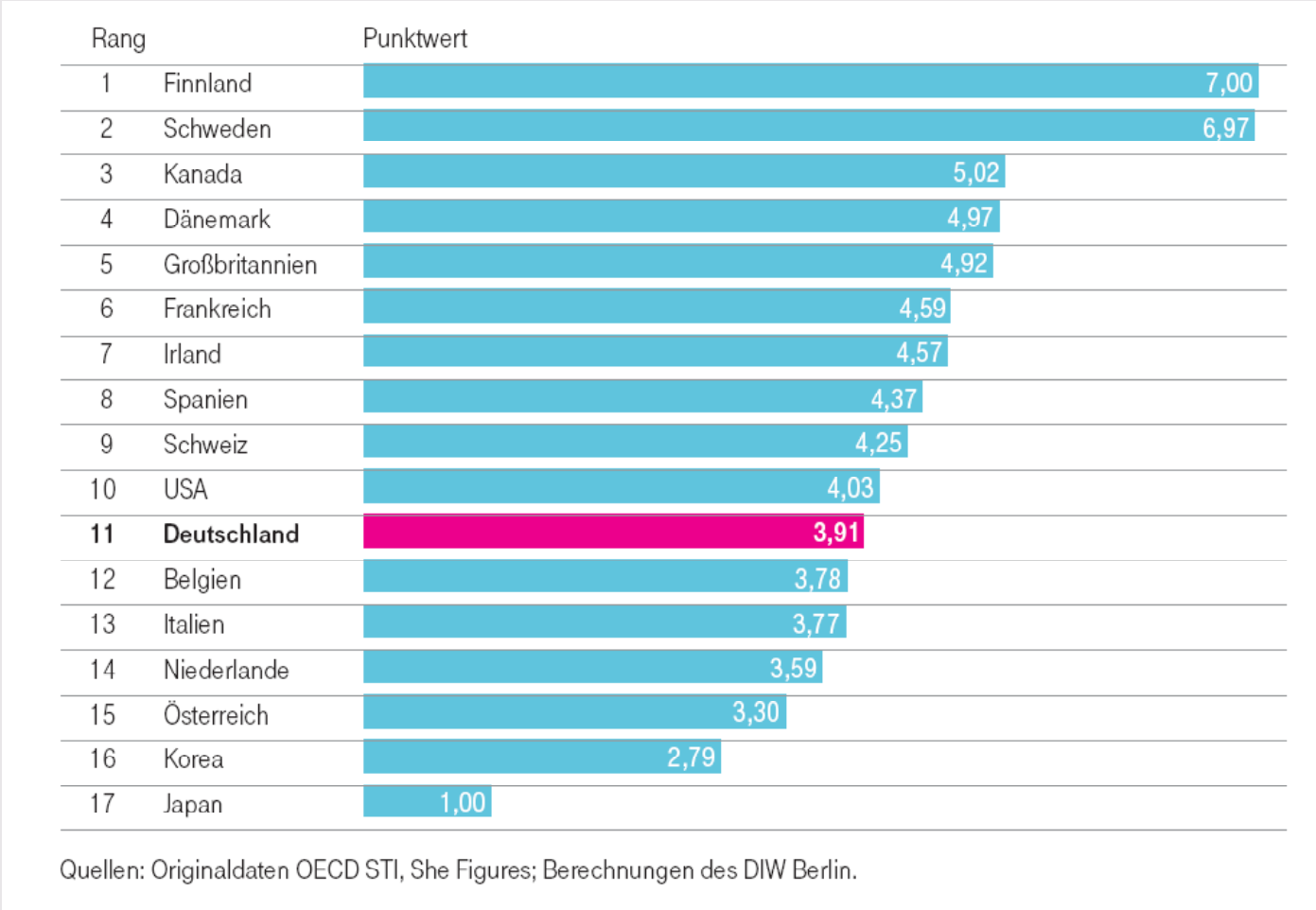
There is a growing lack of qualified teachers in mathematics in schools, too.

We need women in MST!

„Women remain the most obvious source for increasing human resources for science and technology in Europe.“

Report by the High Level Group on Increasing Human Resources for Science and Technology in Europe, 2004

Women‘ s partizipation in Innovation. Germany on 11th place



Source: BDI: Deutsche Telekom Stiftung. Innovationsindikator Deutschland 2006, page 99

Women‘ s partizipation in Innovation. A study of the German Telekom Foundation

- In Germany women are participating less in innovation processes than in other European countries.

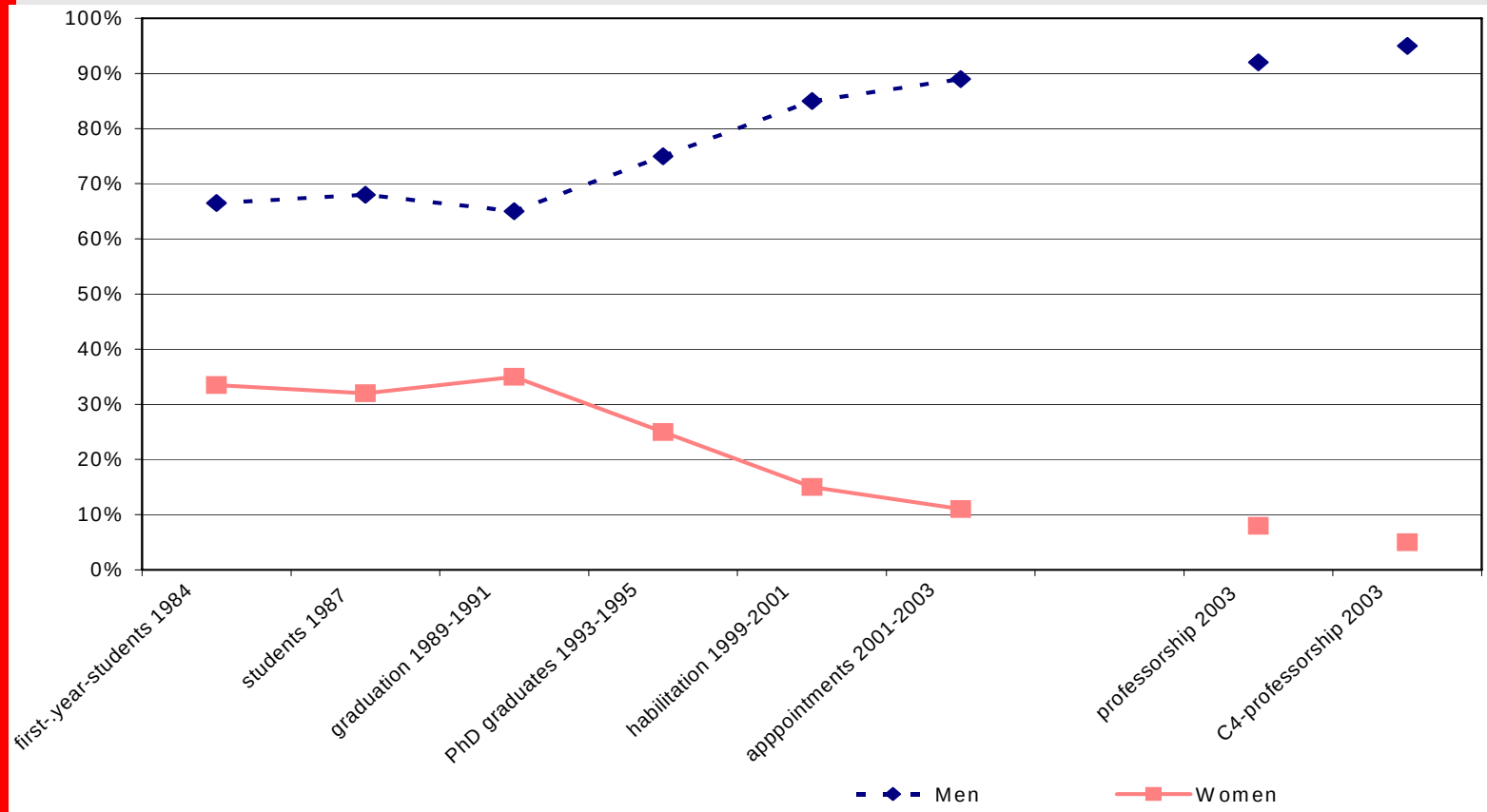
- Leadership in science and technology is male-dominated, even in women-dominated fields of study

- Barriers for women in Germany are seen in societal reasons:
  - the attitudes in society about women at work,
  - the unsufficient support in parental matters and
  - subtle forms of discrimination

Source: BDI: Deutsche Telekom Stiftung. Innovationsindikator Deutschland 2006.

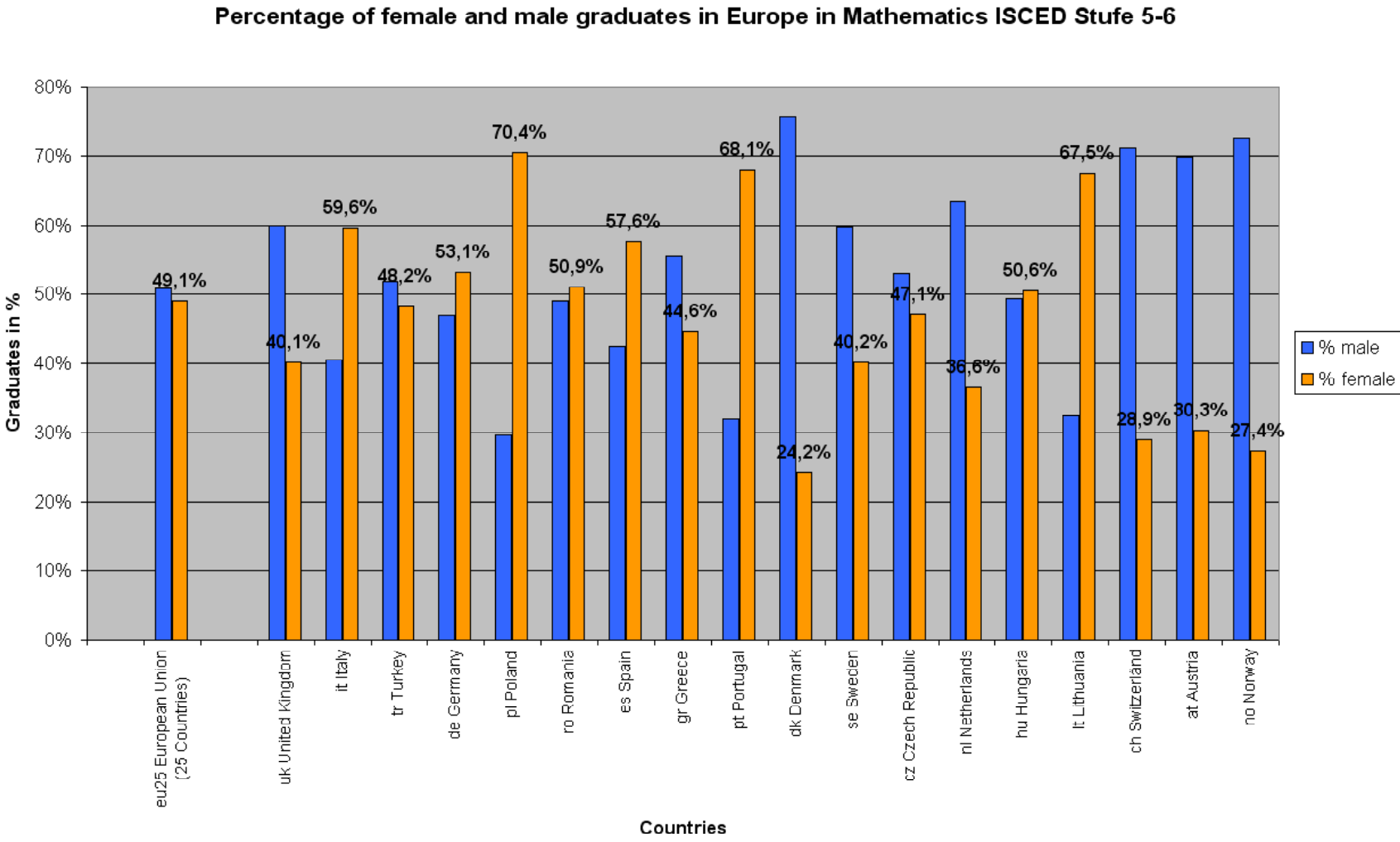
Why so few over the years?
Leaky Pipeline in Science and Maths

Cohort - science and mathematics



Source: BLK-Bericht : Frauen in Führungspositionen an Hochschulen und außerhochschulischen Forschungseinrichtungen – 9. Fortschreibung (Heft 129)

Large differences in the participation of women in mathematics and statistics in Europe

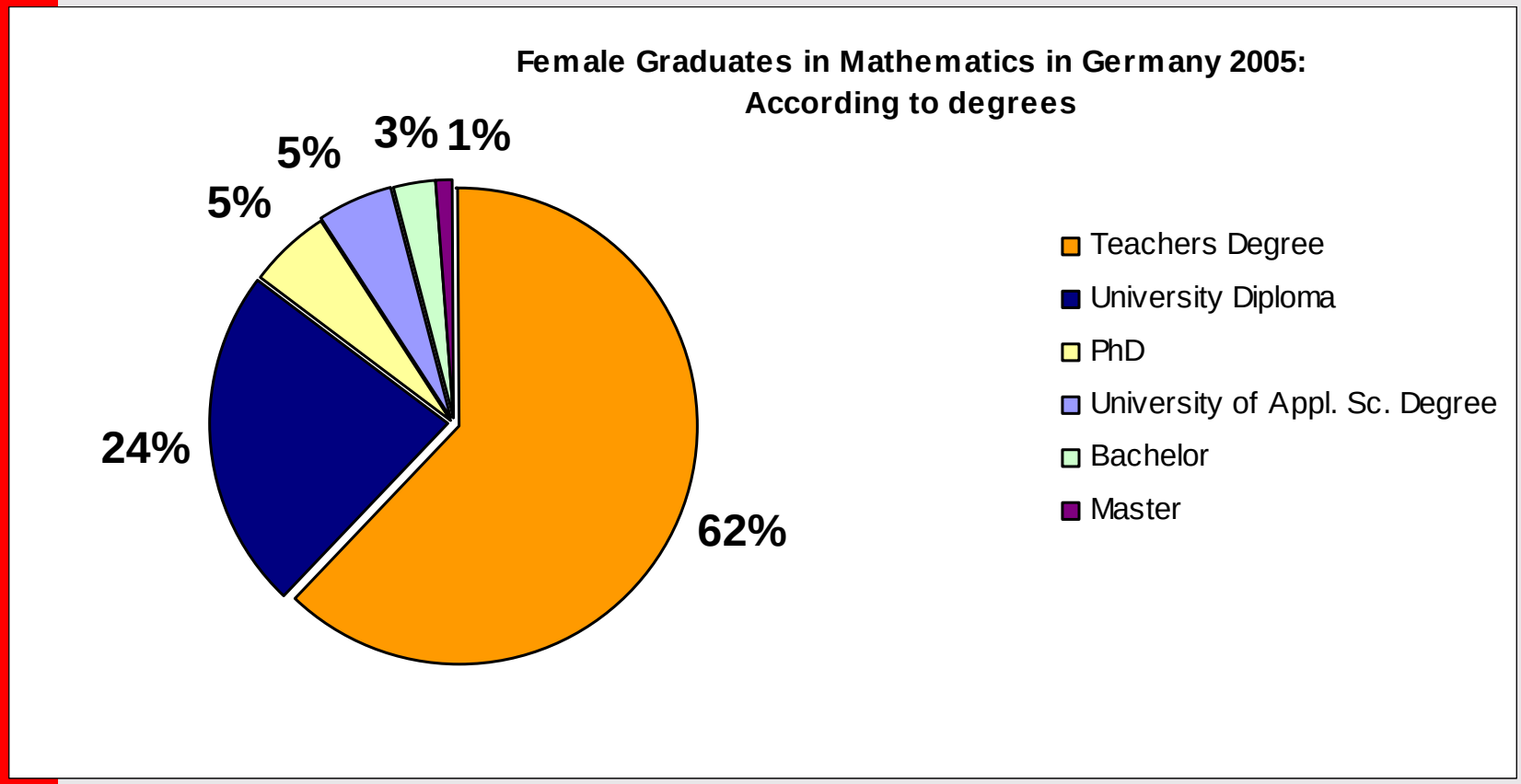


Germany: 53 percent female graduates in Mathematics and Statistics

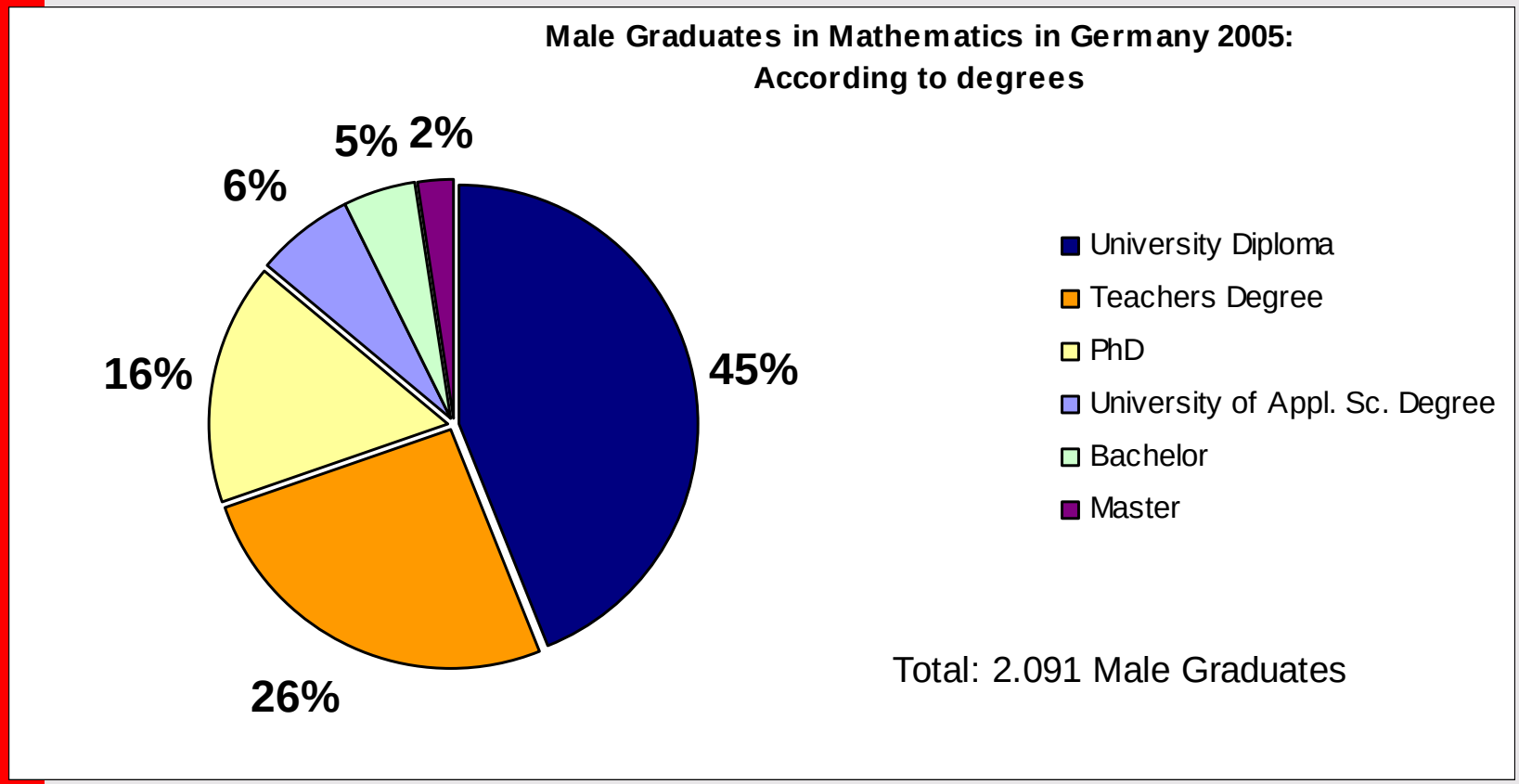
Female participation in maths and statistics in some selected European countries

Denmark	24 %
Norway	27 %
Sweden	40 %
Turkey	48 %
Germany	53 % (but more than 62 % choose teachers degrees)
Italy	59 %
Portugal	68 %
Poland	70 %

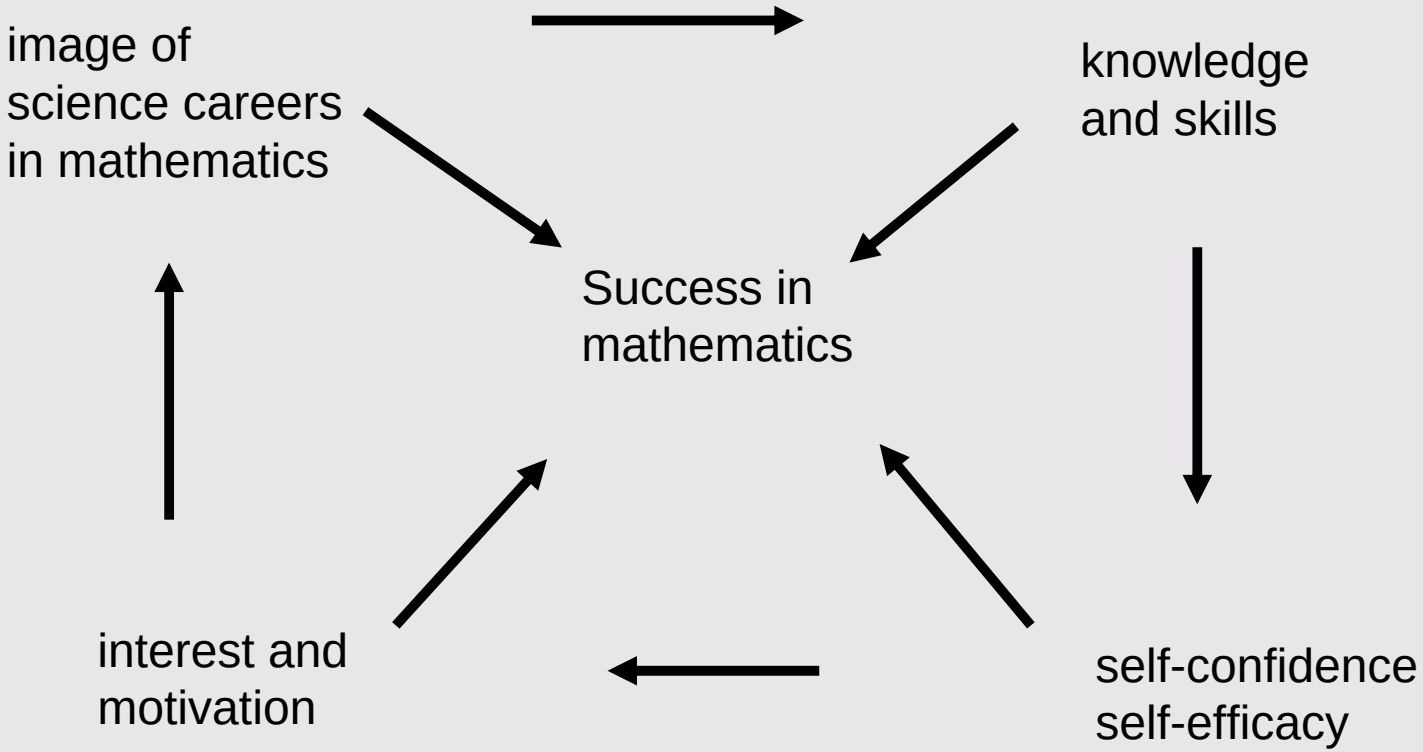
Majority of female graduates in Germany with teachers degrees



Majority of male graduates in Germany with university diploma



Why don´t girls choose scientific careers in mathematics? What are the sucess-factors?



1. Gendering Science Years (the girls)

Aim: Integrating gender aspects into the nation-wide information campaigns for Science Years.

Activities (for example Year of Informatics 2006):
Brochure presenting the CVs of women according to different career stages and representing the range of different working fields (image and interest)

Activities:

Hands-on acitivities for school girls - (self-confidence, self-efficacy)

COMPUTER SCIENCE Unplugged

Workshopmodul Sortiernetzwerke „Besiege die Uhr“

©Computer Science Unplugged unplugged.canterbury.ac.nz
von Tim Bell, Ian H. Witten und Mike Fellows

Sortieralgorithmen unplugged 1

1. Gendering Science Years (women)

Activities: Adressing Women in Informatics and Mathematics
Congress Excellence and Power at CeBIT-fair 2006 – work life strategies with prominent mixed-teams from companies and research (role models for women in leadership, image of careers in companies and in research).

Networking with the female networks in science and mathematics (self-confidence)

2. Roberta – Teaching gender sensitised Robotics with lego-mind-storm sets in schools

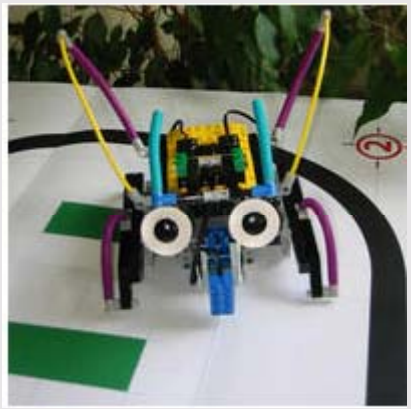
Aim: Let the girls work with the Roberta-construction kits and see that it is easy to learn programming and mathematics and that they are good in it.

Roberta-instructors and materials are sensitised for the interests of girls. They take part in competitions like the Robocup Junior, where there are new leagues like the dance-league, the rescue-league,….

2. Roberta – Teaching gender sensitised Robotics with lego-mind-storm sets in schools

In Lower-Saxony Roberta was integrated into Computer Science-courses (Informatics and Media-Informatics) at the University of Osnabrück and the Osnabrück University of Applied Sciences.

Students are taught how to work with Roberta, learn about gender didactics and then go into schools to teach Roberta to girls and boys in school as a part of the soft skills needed.



3. Driving licence in mathematics for engineering

At the university of applied sciences in Dortmund they invented an interactive mathematics driving licence in the internet for elder school children and students in the beginning of their studies.
These young people

- can see what skills are needed in Mathematics for university purposes
- can train things they are not good in before going to university
- Become reassured about the nthings they learned already

A lot of girls have rather little self-confidence in their own abilities in Mathematics in spite of their high marks. By working with this tool they will experience that they already are good in mathematics and that it is possible to learn things missing sucessfully.

Next year will be Science Year of Mathematics in Germany!
Lots of chances to continue the discussion!

If you are interested in some of the figures or the projects, do not hesitate to send an e-mail. We will be glad to help you.

Barbara Hartung – barbara.hartung@mwk.niedersachsen.de

Barbara Schwarze – schwarze@kompetenzz.de