



008

# The Effectiveness of Interventions from the Perspective of Teachers and Students in the Field of Engineering Education at Universities in Germany

**W. Schneider<sup>1</sup>**

Research Assistant  
Gender Studies in Science and Engineering, TU München  
Munich, Germany  
wolfram.schneider@tum.de

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**S. Ihsen**

Prof. Dr.  
Gender Studies in Science and Engineering, TU München  
Munich, Germany  
ihsen@tum.de

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The improvement of teaching quality and the effects of interventions in favor of good teaching at the universities are relevant requirements of the growing importance of (engineering) education in the context of excellent science. The impact of attitudes of teachers to the satisfaction of the students is an important question that was hardly in the focus of empirical research so far. The project "Lewi - teaching effectiveness and interventions" seeks to explore empirically the relationship between patterns of attitudes of the teachers and the impact on teaching and the students. In addition, this project will develop, implement and evaluate a special coaching for teachers at university.

<sup>1</sup> W. Schneider, wolfram.schneider@tum.de



In the first phase of the project, qualitative and quantitative instruments were developed to evaluate the attitudes of teachers towards teaching, the bologna process, the students, aspects of gender and diversity and further training. On the basis of a german-wide online survey and qualitative interviews with teachers at three universities an individual, process-oriented coaching instrument for teachers was developed and implemented. The teachers were accompanied for a semester and coached in several courses. The coaching takes care of the individual interests of teachers and encourages them to make new teaching experiences. Through this guidance the teachers also learn to consider their teaching from the perspective of students. To evaluate the effectiveness of the interventions, they were supervised scientifically: The coaching concept provides several measure points during the semester. Short interviews, feedback sessions, participant observation and surveys with teachers and students were used.

So far a total of 32 teachers were coached. The focus was mainly on engineering education and engineering courses.

The results of the interventions document a number of changes (e.g. towards the satisfaction of teachers and students): The interaction between students and teachers and the teaching environment were improved, the students were activated and teachers are able to recognize the learning progress of the students and so could better assess what was (not) understood. However, it takes time for both sides: For the teachers to change their approach or concept of teaching and for the students to get used to these changes.

The approach outlined here represents a novel approach to university teaching interventions, because the empirical analysis of the relationship between teaching and learning in engineering education were created as comparative studies in different contexts and universities. In addition, the results contribute in several ways from the quality assurance of teaching, as they fed back to the cooperating teachers and faculties. The results of the interventions will be presented at the 40th SEFI Annual Conference and discussed with the participants. ■