

FIRST RESULTS OF A STUDY IN DIFFERENT MATHEMATICAL THINKING STYLES OF SCHOOL CHILDREN

GABRIELE KAISER , RITA BORROMEO FERRI

UNIVERSITY OF HAMBURG

First results of an empirical Study of different styles of mathematical thinking of teenagers (9th and 10th class) will be represented. In connection with the empirical Studies by Leone Burton (1997) on practising mathematicians by means of a classification attempt by Felix Klein (1892), the following thinking styles are distinguished: • Visual thinking style • Analytic thinking style • Conceptual thinking style. Single mathematicians change between several thinking styles, but nevertheless one style is dominant.

It shall be investigated, how far the recognised styles of mathematical thinking of the practising mathematicians can be reconstructed with school children or, how far other thinking styles can be distinguished. This study is laid out as a quality oriented case study based on the following design: Pairs of female or male pupils will be video-taped while working on mathematical problems. Then the problem solving processes carried out by the pupils and the underlying thinking style will be documented by means of the method of stimulated recall and an interview which will be recorded by audio-tape. In the following the video and audio recordings will be transcribed and analysed by categories which still have to be developed. A central point of this design are the problems itself, originating from different mathematical topics which need different problem-solving strategies (e.g. graphic-visual strategies, numeric strategies, algebraic-algorithmic strategies, trial-and-error methods.). By this the use of different thinking styles shall be stimulated.

Within the framework of school teaching this study is of highly explosive nature: Generally, a teacher has his own dominant style of mathematical thinking, that normally he is not conscious of, and this style is underlying his school lessons and simultaneously structuring it. School children and teenagers, using other thinking styles than a teacher, have – this must be expected – clearly more difficulties with the lessons than those using thinking styles which are similar to those of their teachers. In order to provide all teenagers the same proportion of participation in the lessons, and to give them the same chances, those different thinking styles must be made conscious, so that one can handle them in a conscious way.

References:

- Burton, L. (1999): Mathematicians and their Epistemologies – and the learning of mathematics, *European Research in Mathematics Education I* (Inge Schwank (Ed.), *Forschungsinstitut für Mathematikdidaktik, Osnabrück 1999, S. 87 – 102.*
- Tobies, R. (1987) : Zur Berufungspolitik Felix Kleins (Vocation politics of Felix Klein)- Grundsätzliche Ansichten-, *NTM- Schriftenreihe Geschichte, Naturwissenschaft, Technik, Medizin; Leipzig 24 (1987)2, S. 43-52.*