Teachers’ subjective theories on algebra
Julia Meinke

To cite this version:
Julia Meinke. Teachers’ subjective theories on algebra. Konrad Krainer; Naďa Vondrová. CERME 9 - Ninth Congress of the European Society for Research in Mathematics Education, Feb 2015, Prague, Czech Republic. pp.3306-3307, Proceedings of the Ninth Congress of the European Society for Research in Mathematics Education. <hal-01289894>

HAL Id: hal-01289894
https://hal.archives-ouvertes.fr/hal-01289894
Submitted on 17 Mar 2016

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L’archive ouverte pluridisciplinaire HAL, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d’enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.
This project concerns the impact of the belief system of teachers on their algebra teaching practices in secondary education. The first step is to reconstruct this belief system. The methodological framework is provided by the Research Project Subjective Theories (RPST). The research design is described here.

Keywords: Algebra, teachers’ beliefs, subjective theories.

INTRODUCTION AND THEORETICAL FRAMEWORK

The main prerequisite for research on subjective theories of teachers are the assumptions of teachers as crucial factors for learning success (Nye et al., 2004) as well as the necessity to consider teachers’ beliefs to understand their actions, planning decisions and behaviour in class (Ernest, 1989). Typical questions that correspond to these actions are: Why is a special content chosen, emphasized or denied? What are the reasons why a teacher decides to use a special method? Stein and colleagues (2007) have shown that planning decisions and the realisation of teaching depend highly on teachers’ beliefs. The following figure illustrates the model of Stein and colleagues (2007) that describes the different phases of curriculum use (Figure 1).

Ontological beliefs of teachers and their impact on teaching have been studied in detail for the areas of elementary geometry (Girnat, 2011) as well as of statistics and probability (Eichler, 2004). There are already some hints that subjective theories of teachers differ in dependence of specific disciplines in mathematics (Eichler, 2011). This is why the project focuses on the research concerning the impact of subjective theories of teachers on the teaching of algebra.

Algebra is regarded as one of the most difficult and at the same time most important topics in school mathematics. It can be considered as the language of mathematics. Algebra is used in every case of generalization or in case of simplifying a complex situation (Usiskin, 1995). For this process it has to be clear what the initial situation, what the target is and which role the variable is playing in it. In this context it is most important for students to understand the use of variables and their meaning (Arcavi, 1994).

METHODOLOGY

To reconstruct the structure of the intended curriculum the Research Project Subjective Theories (RPST) is used. Subjective Theories are defined as „complex cognition aggregates of the research object, in which their cognitions relating to the self and the world become manifest and which show an at least implicit argumentational structure“ (Groeben & Scheele, 2001, p. 2). The outcome of this is the dialogue-hermeneutic method. The researcher has to communicate with his research object to understand the cognitions behind his actions. The study was conducted by interviewing nine teachers by using half-structured interview-guidelines, based on an interview-study that was conducted before. Afterwards teachers were visited twice in their algebra classes unheralded. To remain as impartial as possible in the observation of the classroom situation, the visits took place before the interviews were analysed. The observation records will be used to investigate how the intended and enacted curriculum relate.

Figure 1: Four phases of curriculum use according to Stein and colleagues (2007)
REFERENCES


Groeben, N., & Scheele, B. (2001). Dialogue-hermeneutic method and the “Research Program Subjective Theories” [9 paragraphs]. *Forum Qualitative Sozialforschung/Forum: Qualitative Social Research, 2*(1). Available at [http://www.qualitative-research.net/fqs-texte/2-00/2-00groeben-scheele-e.htm](http://www.qualitative-research.net/fqs-texte/2-00/2-00groeben-scheele-e.htm)

