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ÜberLeGMa - different facets of pre-service teachers' belief

Abstract

Mathematics teacher education and teachers' professional development should provide learning opportunities for historical and epistemological aspects of mathematics in order to actively promote the willingness of teachers to use historical references in their own mathematics teaching. Different approaches for teacher education courses or university lectures address respective learning content in many ways. While there is a rich literature on the value of including history of mathematics in mathematics teaching and also a lot of empirical research on the beliefs of teachers about mathematics, there is very little empirical and quantitative research on teachers' beliefs about the history of mathematics. However, in order to be able to describe the effects of teacher education measures more precisely, a diagnosis of the initial learning situation and also possible learning outcomes of pre-service or in-service teachers are required. The empirical study ÜberLeGMa (Buchholtz & Schorcht, 2014) therefore focused on the evaluation of prospective teachers' beliefs about the history of mathematics. Based on empirical surveys about beliefs on mathematics as a scientific discipline (Grigutsch et al., 1998) and the teaching and learning of mathematics (Staub & Stern, 2002) and theoretical frameworks about beliefs on history of mathematics (Fauvel & van Maanen, 2000; Jankvist, 2009; Alpaslan et al., 2014; Tzanakis & Arcavi, 2000), the authors created an online-based questionnaire to survey prospective teachers beliefs about mathematics, history of mathematics and the teaching and learning of mathematics. This questionnaire was used in a study in several German universities to evaluate different aspects of prospective teachers' beliefs about the history of mathematics in education. The main research interests of ÜberLeGMa were:

(1) to map and to explore different facets of respective beliefs; (2) to analyze the structure of and the relations between respective belief-facets; (3) to identify prerequisites, strengths and challenges in the distribution of respective beliefs among pre-service teachers.

141 prospective teachers from primary and secondary school level took part in this survey. First results of ÜberLeGMa showed different views of beliefs about the history of mathematics. The authors were able to distinguish five different views on the basis of factor analyzes: A static view ("In the future, there will be no new mathematical developments"), a real life view ("history of mathematics shows the everyday utility of mathematics for human beings"), a process-oriented view ("history of mathematics shows the constant questioning on mathematical knowledge"), a protagonist view ("history of mathematics shows the life and work from very important persons"), and a perfectionist view ("history of mathematics attests the development of mathematical ideas towards a perfect mathematic"). The identified views were related with each other, e.g. there were found negative correlations between the process view and the static view while the real life view and the perfectionist view created a positive relational structure. Furthermore, the authors found correlations between beliefs about mathematics and beliefs about the history of mathematics. As part of an oral presentation, the results of the study will be presented. Researchers from mathematics education may use the developed instruments (in English) to evaluate the learning outcomes of lectures and courses.

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