

THE RELATIONSHIPS BETWEEN THE TRADITIONAL BELIEFS AND PRACTICE OF MATHEMATICS TEACHERS AND THEIR STUDENTS' ACHIEVEMENTS

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The importance of teachers' beliefs for students' learning is highlighted from different sources showing that teachers' beliefs affect their teaching approach that, in turn, affects students' achievement. The studies of mathematics teachers' beliefs in Latvia brought out a contradiction between teachers' constructivist beliefs on teaching and learning and their traditional routine work while revealing match between some traditional beliefs on teaching and learning and traditionally-oriented instructional practice. The aim of the present study is to explore the possible relationships between the traditional beliefs and practice of mathematics teachers and their students' achievement in mathematics. For this purpose the Latvian data from two international research projects were analyzed. The sample included 190 mathematics teachers and their 2828 students from grade 9 representing different regions of Latvia, schools with different programs of education, rural areas and cities. The results suggest that the traditional beliefs of teachers are connected with lower students' achievement in mathematics test, while teachers' traditionally oriented self-reported practice is positively related to the achievement of their students.

Key words: *teachers' espoused beliefs, reported practice, students' achievement.*

THEORETICAL FRAMWORK

Belief entails individual, seldom – stable subjective knowledge that includes person's feelings or care (Pehkonen, 1994). The given study is focused on teachers' beliefs. We will single out teachers' espoused beliefs from all the diverse other beliefs of teachers. Teachers' espoused beliefs (what is said) about teaching are what teachers think about the impact of teaching in general, as well as their understanding of how children learn (McMullen, Elicker et al., 2006). It is important to pay attention, along with teachers' espoused beliefs, to their reported practice. In the given research, exactly due to these reasons survey on reported practice followed in a common package with the survey of teachers' beliefs. Teachers' reported practice (what is done) is teacher's recognition of methods used in class and the frequency of using them (almost every lesson, at about half of lessons, in some lessons, never).

The world educational research has recently manifested a dichotomous division of teachers' beliefs and approaches to teaching and learning: *the traditional beliefs* and *the constructivist beliefs* (OECD, 2009).

The aim of the present research is to make out whether there is correlation between the *traditional* orientation in *teachers' espoused beliefs* and reported practice and the achievements in mathematics of these teachers' students. Two research questions were set: 1) what relationships exist between the traditional espoused beliefs of teachers on teaching mathematics and their students' achievement in mathematics? 2) What relationships exist between the traditional

orientation of teachers in self-reported practice and their students' achievements in mathematics?

METHOD

The given research has used data of two international studies: Singapore National Education Institute project "Non-Cognitive Skills and Singapore Learners – an international comparison" and NorBa project "Nordic-Baltic comparative research in mathematics education". The following methods of statistical analysis were used for data processing: Kolmogorov-Smirnov test to assess the distribution of data, descriptive statistics, frequencies, two step cluster analysis, factor analysis, hi-quadrangle criterion, Wilcoxon criterion, Kruskal-Wallis criterion, Mann-Whitney criterion as well as Cronbach Alpha to assess the reliability.

RESULTS

The research data base shows that there exist correlation between Latvian teachers' espoused traditional beliefs on teaching mathematics and their students' achievements in doing mathematics tasks: the more distinct teachers' espoused traditional beliefs, the lower their students' achievements. On the other hand teachers' traditional inclinations in their reported practice have a positive impact on their students' achievements. Completely different tendencies of teachers' espoused beliefs and reported practice may be accounted for by the fact that the major factor of influence on learner's achievement is not the teacher's beliefs but readiness to change, i.e. to change his/her beliefs as well as an ability to adapt his/her practice to the learners' intellectual level, needs, motivation. At the same time these teachers continue to use traditional methods gradually introducing new ones in their work. Despite the fact that the education philosophy reflected in the State Education standard is oriented toward the process of learning, in reality the mathematics education in Latvia is measured by students' achievement that, in turn, is characteristic of the traditional paradigm of education. Indeed, after every three years every learner in Latvia must take a compulsory centralized test or state examination in mathematics, regular mathematics Olympiads have been organized on local and state level. Learners' achievements in Olympiads and examinations are the basis of mathematics teacher ratings. This may account for the great influence of traditional reported practice on learners' achievements.

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