Conference of the Southern Africa Mathematical Sciences Association - SAMSA2016
November 21 - 24, 2016, University of Pretoria, Pretoria, South Africa

Pre-service teacher knowledge for teaching foundation phase Mathematics: an analysis of pre-knowledge for multiplication

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Abstract

The purpose of this longitudinal study is to determine how first-year Foundation phase mathematics students' pre-knowledge, with regards to teaching Mathematics, develops and increases over a four-year study period. This paper reports on our very first investigation with regards to their level of pre-knowledge, right at the beginning of their first year of study. It is a qualitative study, firmly grounded in the interpretivist paradigm, but with additional quantitative analyses. An open-ended questionnaire was presented to 239 first-year Foundation phase mathematics students. They were requested to explain what their understanding of the term 'pre-knowledge' is, and to determine pre-knowledge for the teaching of multiplication by two, to a grade 2 class. The first question was analyzed by grouping similar responses into groups, identifying themes for each group of responses, and by counting the number of responses per theme. It was found that 65% of the responses illustrated an accurate understanding of the term 'pre-knowledge'.

The second question was analyzed in two different ways. The first analysis determined to what extent the participants could answer the question. The results show that 42,5% of the participants could provide one aspect of applicable pre-knowledge, but that 40,5% of the participants provided answers to the question that did not contain any applicable pre-knowledge. The second analysis determined the frequencies of applicable pre-knowledge for teaching multiplication by two, as mentioned by the participants. Counting in 1s and 2s, knowledge of addition, and knowing how to multiply, were the three main aspects of pre-knowledge identified. Although the majority of participants could illustrate an adequate understanding of the term 'pre-knowledge', less than half of the participants could identify at least one aspect of pre-knowledge for the given mathematics content. This reveals a clear gap between knowing and actually doing, which will have to be carefully addressed over the course of the participants' studies.

Keywords: Mathematics teaching; Foundation phase; pre-knowledge; teaching multiplication by two; gap between knowing and doing.

Category: **Mathematics in aducation.**