

学位論文の要旨 (論文の内容の要旨)
Summary of the Dissertation (Summary of Dissertation Contents)

論 文 題 目

Dissertation title:

The Open Approach and its Impact on Jamaican Elementary Students' Understanding of Mathematical Concepts in the Number Strand: A Gender and Class Setting Comparison

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Using Jamaican grade four students as participants, the purpose of this research project was to examine the impact the open approach has on the understanding of mathematical concepts in the Number Strand. The study was conducted in order to provide insight into teaching male and female students in different class settings using the open approach. The participants were from two public schools in Jamaica and were organised into co-ed, all-boys and all-girls classes respectively. Both quantitative and qualitative data were used to compare students' responses to an open-ended problem and its impact on their understanding of mathematical concepts. A pre-test was administered to all participants, followed by six months of teaching with the open approach method and the administering of a post-test. Data were gathered from observation of lessons and from assessment of written tests done by the students. The Statistical Package for the Social Sciences (SPSS) was used to assist in descriptive and inferential statistical analyses of the quantitative data. One Way of Analysis Variance (ANOVA) tests were used for comparing mean values of test items. The qualitative analysis was based on the observation notes which were collected throughout the process (Bogan & Biklen, 1998; Creswell, 2009; Marshall & Rossman, 2006). Results from quantitative data were used to answer research question one, two and three while results from qualitative data were used to answer research questions four and five.

Results show that the use of the open approach with open-ended problems had a positive impact on students' understanding of mathematical concepts regardless of gender or class setting. This was evidenced by the fact that all groups had an increase in performance on the post-test when compared with the pre-test, and all were able to produce more solutions at the end of the intervention than they did at the beginning.

Boys showed higher averages and displayed a greater understanding of concepts than the girls did. Girls showed a greater tendency towards using traditional methods but had little understanding of the method they used. Girls obtained higher scores than boys on closed items, but boys obtained higher scores than girls on open-ended items.

With regards to class setting, boys in the co-ed group displayed greater understanding and had more solution methods than boys in the single-sex class, but this was not significant for most items. The girls in the single-sex class showed greater understanding of mathematical concepts than girls in the co-ed class, but this too was varied and had no significance on most items.

It was concluded that the classroom environment created by the open approach that resulted in a positive

impact on students' understanding is characterised by student-autonomy, discussion of a multiplicity of ideas, inter-connectedness of concepts, thoughtful reflection and relevance to students' everyday life. The researcher contends that through the synthesis of the findings of this study, teacher educators and educational policy makers can revisit and revise instructional practices so that teachers can better assist students to develop greater understanding of mathematical concepts.