TEACHERS' PERCEPTIONS OF THE RELEVANCE OF THEIR MATHEMATICS INSET PROGRAMME

Mdutshekelwa Ndlovu

Stellenbosch University

Extended abstract

The purpose of this paper is to report on teachers' perceptions of the relevance of an in-service education and training (INSET) programme with specific reference to the topic of transformations presented by the researcher among other topics and several other presenters. Fifty-one Senior Phase (SP) teachers took part in the study in which they answered a questionnaire with both open-ended and close ended items. The INSET programme used the Realistic Mathematics Education (RME) approach to teacher professional development with mathematical tasks intended to enhance their mathematical knowledge for teaching. Results suggest that the majority of teachers experienced the sessions positively in relation to all but one of the six RME principles. The teachers reported that they took an active part both as individuals and as small groups and some even expressed their intention to adopt the type of activities and materials for their classrooms. They recommended that more time be allocated.

INTRODUCTION

The poor performance of Grade 9 learners in the Annual National Assessments (ANA) for mathematics in 2012 was a shock to the nation and not easy to explain. Apart from calling into question the validity of the assessment itself, the ANA results directly implicated poor quality teaching of the learners in the Senior Phase when compared to other phases of schooling. As a result the researcher sought to investigate the effectiveness of an in-service programme in which he was involved in the Western Cape Province of South Africa.

The recently published Global Competitiveness Report for 2012-2013 (Schwab, 2012) ranks South Africa's mathematics and science education at 140/144 countries (or 98th percentile), up only by one percentile from the previous year where the country ranked 138/140 (or 99th percentile) (Schwab, 2011). Although the report is based on perceptions rather than actual performance it confirms the country's unsatisfactory performance in international benchmark tests. For example, the recently published Trends in International Mathematics and Science Study (TIMSS) 2011 results rank South Africa's Grade 9 mathematics performance at 57 out of 59 countries which participated (Mullis, Martin, Foy, & Arora, 2012).

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CONCEPTUAL FRAMEWORK FOR TEACHER PROFESSIONAL LEARNING

The curriculum materials used for mathematics INSET for the Senior Phase (SP) were specifically designed to allow for a Realistic Mathematics Education (RME) approach which originated from the Freudenthal Institute in the Netherlands (Van den Heuvel-Panhuizen, 2000). The RME approach is a neo-constructivist approach which stresses that mathematics learning should, in Freudenthal's (1977) view, be connected to reality, stay close to children's experience and be relevant to society, in order to be of human value. The focal point should not be on mathematics as a value- or context-free system but on the activity, or the process of mathematisation (Freudenthal, 1991). Treffers (1987) elaborates on mathematisation as consisting of both horizontal (solving problems set in a real life situation, going from the world of life to the world of symbols) and vertical (reorganisation from the mathematical system itself, finding shortcuts and discovering connections between concepts and strategies and applying these strategies) dimensions. Van den Heuvel-Panhuizen (2000) stresses that RME is underpinned by six principles of instructional design, namely: 1) the Activity Principle, 2) the Reality Principle, 3) the Level Principle, 4) the Intertwinement Principle, 5) the Interaction Principle and 6) the Guidance Principle.

RESEARCH QUESTION

How relevant is an RME approach for the professional development of SP mathematics teachers?

RESEARCH METHODOLOGY

A convenient sample of 51 (out of 53) Senior Phase Mathematics teachers that participated in the workshop sessions responded to the feedback questionnaire.

A mixed-methods approach was adopted using a questionnaire with both closed and open-ended items. The research design took the form of a survey to elicit the quickest responses with the least strain on teachers and yet informative enough for subsequent sessions in the year.

RESULTS

Quantitative results of the questionnaire

There was an overwhelming consensus about the suitability of the content, activities, didactical approaches and the teaching materials.

Qualitative results

There was overwhelming evidence of the geometrical content on transformations to the Senior Phase**.** With respect to the cognitive demand levels of the mathematical tasks, some participants felt they were easy for them while others felt they were challenging or at least would be challenging enough for their learners. The participants overwhelmingly perceived their level of participation to have been very

high both individually and in small groups. With regards to the relevance and adequacy of teaching and learning materials, the majority of participants reported that the materials they used were adequate for the tasks and some declared their readiness to adopt some of the activities and materials used for their own classroom practice.

.Many participants felt that the time allocated was inadequate. Some indicated that they would have preferred their home language (predominantly Afrikaans) to be used for instruction and materials. Yet others felt competent enough to be engaged as facilitators. At the end of the two-week workshop the participants were issued with CDs containing all workshop materials in both Afrikaans and English.

CONCLUSIONS

The RME model of in-service teacher education resonated with participants who felt they were better prepared to adopt some activity-oriented tasks in their classrooms in the teaching of geometry. Many SP teachers of mathematics are not specialist mathematics teachers and thus require constant support. Yet others feel competent enough even to be engaged as facilitators. The recent removal of transformation geometry from the Curriculum and Assessment Policy Statements (CAPS) for the Further Education and Training Phase has caused some teachers to question the future relevance of the topic to the Senior Phase.

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