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# Investigating mediation strategies used by early years mathematics teachers in Malawi

Fraser Gobede

University of Malawi, Malawi; [fgobede@cc.ac.mw](mailto:fgobede@cc.ac.mw)

*Keywords: Early years mathematics, mediation, Malawi*

## Introduction

Teaching mathematics to children in their early years of primary schooling is a very challenging undertaking. Teachers usually find it difficult to design tasks that can keep young minds engaged and motivated throughout the lesson. In Malawi, the task is even more difficult considering that 60% of learners do not have the opportunity of attending some form of pre-school education; hence most children are formally introduced to concept of number in grade 1 at the age of six, or more (Robertson, Cassity, & Kunkwenzu, 2017). If number sense is not properly introduced to learners, the result might be a wide gulf between school mathematics and their everyday experiences of actual mathematics, making them disengage their minds in the subject despite efforts of the teacher (Boaler, 2016). For children in Malawi, the problem of lack of understanding Mathematics is often observed from the perpetual low scores attained by learners during standardised national examinations and international assessments in mathematics and numeracy. As such, this study seeks to understand ways in which early years mathematics is taught in Malawi and assess the opportunities of learning offered through their approaches. The study will seek to answer the question: How do Malawian teachers mediate mathematics during lessons in the early years of primary school? The main question will be answered through the following subsidiary questions: How do teachers in early years work with tasks and examples during lessons? How do mathematics teachers use artifacts during early years of primary school? In what ways do teachers use inscriptions to represent mathematical processes in early years? What talk/gestures do teachers use to generate solutions to problems, make mathematical connection, and advance learning connections?

## Theoretical Framework

This study is guided by the Mediating Primary Mathematics (MPM) framework developed by Venkat and Askew (2018). The framework focuses on the nature of the mathematics that is made available to learn and enables a detailed exploration of the quality of primary mathematics instruction. The MPM framework applies variation theory to understand teachers' use of example spaces during instruction (Kullberg, Kempe, & Marton, 2017). It is grounded on Vygotskian concept of mediation as the major requirement for learning and adopts sociocultural theory to understand the teacher's role as the sole mediating agent in the classroom, determine the goals in mathematical instruction, and determine sociocultural materials and practices for mediation. The framework identifies four overarching means of mediation (called strands), which are: Tasks/examples, artifacts, inscriptions, and talk/gesture.

## Research Design and Methodology

The research will adopt a qualitative exploratory case study design. One rural primary school in a remote village will be purposively selected as a paradigmatic case of exemplary performance during standardised national examinations, despite having limited teaching and learning resources. Lessons will be observed from four outstanding mathematics teachers (one in each of the first four early years classes), identified by the school authorities. The classroom observations will be followed by video-stimulated recall interviews (VSRI) with each teacher to elicit their thinking behind the choices made during the lesson. Document analysis will also be done on learners' notebooks, textbooks, mathematics syllabi, teachers' guides, lesson plans, schemes and records of work. Recorded videos of lessons will be analysed using MPM's tool for lesson analysis (Venkat & Askew, 2018).

## Pilot Findings

The study was piloted with a grade 2 teacher at another well performing rural primary school. The findings from the pilot study indicated substantial use of artifacts to explain new concepts during lessons. Single-use artifacts were mainly developed by the teacher while multiple-use artifacts, such as counters, were brought by children in collaboration with their parents. Chalkboard inscriptions were also used to reify the artifacts when representing concepts during lessons. Highest levels of abstraction were achieved with talk and gesture that corresponded with the tangible artifacts and the written inscriptions. This shows that highest opportunities for learning are afforded when artifacts, inscriptions, talk and gestures are used concurrently to represent a single concept.

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