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The role of the teacher in developing learners' mathematics discourse and understanding

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Abstract

This study focuses on the role of the teacher in developing learners' mathematics discourse and understanding. Mortimer and Scott's (2003) framework of meaning making as a dialogic process was used in conjunction with variation theory, in order to gain an understanding of the role of the teacher in mathematics classrooms. I collected data in three phases: phase one was pre-observation interviews of 6 teachers at three high schools in one Province in South Africa; phase Two was through video recorded classroom observations of three teachers (selected from phase one), and phase three data collection was through post-observation interviews of the three teachers. Based on Mortimer and Scott's framework, variation theory, and other relevant literature, I developed an analytical framework which I used to analyse the data collected. The findings that emerged from the study indicate the intricate role of the teacher, with multiple layers embedded in the teacher's day-to-day tasks in the classroom setting. The role of the teacher in selecting an appropriate example set and enacting it in a way that provides opportunities which lead to developing learners' mathematics discourse and understanding was one of the findings in the study. Like some of the literature reviewed, the study found that everyday contexts in the example set may not enable learners to develop their mathematics discourse and understanding if not carefully selected and enacted. The communicative approach and patterns of discourse that were used by the teachers enabled different possibilities in the process of enacting the example set selected. The implication of the findings is that the example set selected by the teacher, whether pre-planned or spontaneous needs to be carefully selected by drawing on the intended object of learning. Variation theory provided a potent way of engaging with the teachers' example set to ascertain what the example set makes available to learn, through patterns of variation. As shown by the study, patterns of variations have great potential to guide the teacher in selecting an example set that brings the object of learning to the fore. A theoretical contribution of this study lies in extending and merging Mortimer and Scott's framework for meaning making and variation theory into describing, analysing and interpreting the role of the teacher in developing learners' mathematics discourse and understanding in functions classrooms. Methodologically, the study contributes to knowledge by providing a framework to analyse and interpret a mathematics example set to ascertain the opportunities that the example set provide for developing mathematics discourse and understanding.