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Abstract

Studies on the teaching and learning of mathematics in multilingual classrooms argue that language is central to the learning of mathematical concepts but that teachers who focus on mathematical register rather than on concepts could inhibit learners' opportunities to develop conceptual understanding. Teaching is mediated through language and thus language use in multilingual contexts is critical. In South Africa, a problem has arisen, that although the Language in Education Policy (LiEP) supports multilingualism, the Curriculum and Assessment Policy Statement's (CAPS) interpretation of the policy provides for monolingual education, albeit in all 11 official languages. The research reported on in this thesis investigated language use by Grade 3 and Grade 4 teachers and learners in multilingual mathematics classes in Gauteng. This study interrogates the question of the language of learning and teaching (LoLT) through focusing on the relationship between variation and standardisation of language use in multilingual early grade mathematics classes. To unpack the drivers of language use, I drew on the theory of multilingualism in mathematics education and on the concept of 'language ideology' from sociolinguistic literature. This enabled me to investigate mixed language use (translanguaging or code-switching) in mathematics classes and the factors influencing it.

The mathematical curriculum topic of patterns formed the content context for the investigation. The research design was that of a descriptive study based on a three-part survey, focus group discussions, and classroom observations. Three of the eleven official languages in South Africa were chosen: IsiZulu (an Nguni language), Setswana (a Sesotho language) and English (the dominant language used in schools and the official LoLT in all schools from Grade 4 onwards in the system). The research was carried out in a sample of 20 schools in three districts in a Province in South Africa (with LoLT IsiZulu, Setswana and English).

Findings from the three data sources (survey, focus group and observation) showed variation in language use and perceptions about language use, with speakers drawing on IsiZulu, Setswana, English and other languages in different ways. Perception data (survey and focus

group discussions) showed a tendency towards pure language use and a preference for the use of English when teaching mathematics. Evidence of this was strong in the written explanations on the survey but in the observations, slightly more mixed language use was evident. The pressure of policy (favouring the use of the LoLT to the exclusion of other languages) is clearly felt by teachers, who comply even when they think that mixing languages is supportive of learner understanding. These findings contribute to the question of whether and if so, how, teachers can utilise their full language repertoire and encourage learners to do so as well. The findings show that there are conflicting language ideologies that drive policy and policy implementation – the evidence shows that policy exhibits an embodied monoglossic ideology while both monoglossic and heteroglossic ideologies are embodied and articulated by teachers. The findings also speak to the language standardisation debate in relation to mathematical register in that teachers expressed the need for standardised language in the teaching of mathematics because they are aware that some terms do not exist in the home languages in which they teach.

Key terms

Early grade mathematics, language use, mathematical register, language ideology, multilingualism, mixed language, translanguaging, code-switching.