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Exploring grade 7 learners' performance in multiplicative and additive reasoning word and pure numerical problems from written tests

Mufara, Chemedzai

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ABSTRACT

This study aimed at exploring learners' performance in multiplicative and additive reasoning word and pure numerical problems from their written scripts. To achieve this, a content analysis of the grade 7 learners' scripts of the pre- and post- tests administered by the Wits Maths Connect Primary (WMCP) as part of their broader project- Multiplicative Reasoning Intermediate Phase (MRIP) project in the Gauteng province of South Africa was done. This was done by comparing differences in learners' performance across parallel word and pure numerical problems that demand multiplicative and additive reasoning, solution strategies and detectable errors in written responses.

Scripts from 143 learners who took part in the main project were used as sources of data for this research. The 143 learners took part in two tests each with 8 problem items divided between word and pure numerical problems. This meant that 2288 learners' responses became available for analysis. The analysis and coding were done per test, and within each test, a comparison was made between mathematical reasoning (i.e. additive and multiplicative reasoning), problem format (word or pure numeric problems) and the correctness of learners' responses coded as correct or incorrect. In addition, the study established the solution strategies employed by the learners and the detectable errors that they committed as they responded to the mathematical problems presented in the tests.

Findings revealed no significant difference in learners' performance in word and pure numerical problems. However, for both problem formats, multiplicative reasoning was more challenging for the learners than additive reasoning. The predominant strategies used by learners across additive and multiplicative reasoning were 'writing the answer only without showing any visible working' and standard algorithm. It was further established that the most prevalent detectable error in the learners' scripts was of a procedural nature rather than operational. Based on these findings, the study recommends that teachers' emphasis should be on the development of learners' multiplicative reasoning and encourage learners to show all their working when solving mathematical problems.