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The Influence of the Language of Instruction on the Teaching and Learning of Mathematics in Grade 4: The Case Dwaalboom Circuit, South Africa

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Abstract:

The purpose of this study was to explore the influence of the language of instruction on the teaching and learning of mathematics. The perpetual poor learner performance in mathematics was a compelling factor in this study. The researcher, as the long-serving grade 4 mathematics teacher, chose grade 4 learners because the transition from grade 3 has negatively impacted the acquisition of mathematics proficiency. The grade 4 have just graduated from the foundation phase where the language of teaching and learning was the mother tongue. In general, the grade 4 performance in mathematics showed a significant decline compared to their performance in the foundation phase. The study followed a qualitative research approach with a case study research design. The population in this study consisted of grade 4 learners and three grade 4 mathematics teachers. Simple sampling was used to select ten learners from each school and three mathematics teachers. The researcher used the interpretation technique to analyze the results. The researcher used a multiplicity of data collection to interrogate the mathematics language proficiency of grade 4 learners. The researcher believed that mathematics was a language on its own; therefore, using various data collection methods would answer the research questions.

Preliminary findings revealed that learners who received instruction in their mother tongue in the foundation phase struggle to understand mathematics concepts when English is used as the language of instruction. Furthermore, learners who used English as their medium of instruction in the foundation phase seemed to have the upper hand over learners who used their mother tongue as their language of teaching and learning in the foundation phase.

In conclusion, this may lead to grade 4 learners not comprehending mathematical vocabulary, communicating ideas clearly and grasping abstract concepts.

Keywords: *Second language, language of instruction, mother tongue, mathematics*

1. Introduction

The question of language of instruction is a complex phenomenon across the world. Decisions on language of instruction and efforts to develop materials and instructional strategies to support the selected language(s) are well underway. The language of instruction in this context is English. In South Africa, we have 11 official languages, but Grade 4 learners can receive education in two languages, which are English and Afrikaans. The majority of African learners pursue their education in English as the national language. Most of the researchers of language instruction around researchers around the world prefer learners to be taught in their mother tongue/ home language instruction, at least in the early years of education.

Ball (2014) stated that learners whose primary language is not the language of instruction in schools are more likely to drop out or fail in earlier grades. Research has shown that children's first language is the optimal language for literacy and learning throughout primary school (UNESCO, 2008:231). The UNESCO publication cited by Ball (2014:127) gives case studies of the strengths and challenges of mother tongue education in Mali, Papua New Guinea, and Peru.

Zafeirakou (2015:54), underpinning this case, states, "Teaching the foundational skills (early literature and numeracy) and critical thinking in a language that the child speaks and understands is one of the most effective ways to reduce school failure and dropout in the early Grades." More importantly, these foundational skills significantly enhance learning later as learners transfer these skills to learning in another language. Goldenberg (2008:235) stipulates that, if feasible, children should be taught reading in their primary language.

2. Method

2.1. Introduction

In this study, the researcher used an interpretive, case study, and qualitative research approach to conduct the investigation. This section will outline how the researcher employed the research methodology to obtain rich information.

2.2. Summary

In this study, the researcher presented the research methodology, research paradigm, and research design applied in this study. The chapter also discussed the data collection instruments, which were a written test, observations, and document analysis. The chapter concluded with a discussion of the ethical considerations made in this study. In the next chapter, the study results are presented and analyzed.

3. Findings

The primary outcomes of this study are discussed below according to the themes that have emerged from the information collected.

3.1. Theme 1: Challenges Associated with Language of Instruction and Education

In this study, the researcher found that language proficiency with Grade 4 pupils is the main barrier to mathematics understanding. The researcher discovered that learners could not interact actively with the teacher during mathematics lessons because they did not know the mathematical terms used in a lesson. Results gathered in this theme assisted the researcher in having an explicit understanding of how learners struggle to comprehend mathematical concepts when English is used as a language of instruction and learning. During data collection, it was evident that if teachers did not code switch, learners would not grasp any mathematical concepts throughout the lesson. This could be detrimental to our society because learners will lose interest in mathematics.

3.2. Theme 2: Language Influence on Mathematics

Theme 2 assisted the researcher in exploring more about language's impact on mathematics. The researcher discovered that learners are unable to answer mathematics questions because of the language used. This became evident when the teacher explained the questions in the learner's home language. This failure to answer mathematics activities indicates that learners did not understand the mathematics concepts that the teacher taught in class. The language impact is a huge barrier in Grade 4 because most of the learners miss the basic fundamentals of mathematics, and this could result in learners dropping out and/or learners making a general hypothesis that mathematics is difficult. Language plays a pivotal role in understanding mathematical concepts.

3.3. Language of Instruction

Theme 3 assisted the researcher in gaining more insight into the language of instruction and education as a medium of instruction. This theme made the researcher aware that not only do the second language pupils have to compete with a diversity of jargon with mathematical registers and changing meanings between registers, but they also need to deal with concepts that do not exist in their home language vocabulary. Language of instruction makes teaching difficult for teachers in Grade 4 because learners very often confuse mathematical concepts with spoken English, which compels the teacher to resort to code switch to accommodate all learners. The main concern for the researcher is that if teachers do not code switch, what would happen to the learners in order to understand mathematics? This language phenomenon makes mathematics lessons become teacher-centered as learners passively participate because they lack the understanding of mathematical terms when English is used.

4. Discussion and Conclusion

The next discussions of key findings are linked to the collected works reviewed and empirical study piloted in this research. The following themes that emerged from the information gathered are discussed below.

4.1. Challenges Associated with Teaching on Mathematics

The research studies revealed that learners at all levels are not as they were likely to tune in to the conversation and examine math phonetics, but too to author around their work in logical etymological. The study review revealed that learners do not comprehend logical concepts, but it also illustrates that they are able to connect numerical information to others. Besides, the key challenges that impact second language learners are their capacity to memorize science in an English medium environment and the trouble of working with English arithmetic. Collected works audit, moreover, found that for learners to be able to achieve competently, they must get the profound mechanical phonetic utilized absolutely in science.

4.1.1. Language Influence on Mathematics

The literature review has exposed the effect of the use of language in teaching and education on arithmetic, which is a question that concerns many mathematics teachers and researchers. Literature found that English proficiency in the language of instruction and learning influenced performance in school subjects, including math, in particular, leading to various studies. The literature review has further discovered that language spoken at home affected learner's education as most families use their native language for communication, yet the language of instruction at school is English.

4.1.2. Language of the Instruction of Teaching and Learning on Mathematics

The literature audit has uncovered that the requirement for arithmetic instruction through the medium of English is basic from the early review so that learners can be fruitful in arithmetical competency. Writing Advance states that the restricted English capability can have an awful effect on learner’s insights, and insufficient etymological attainment may impact the actualization of insights. Learners who are instructed in a different language do not accomplish instructive brilliance since they are less able but since phonetic obstructions in the arithmetic of etymological speakers. Writing survey has to encourage found that the essential challenge in multilingual classrooms in South Africa is the reality that whereas control for English is unavoidable, many learners do not have the level of familiarity that empowers them to lock in scientific assignments set in English.

Primary Schools	Pseudonyms for the Purpose of Anonymity	Gender	
		Boys	Girls
School A	Learner 1-10	5b	5g
School B	Learner a-j	5b	5g
School C	Learner i-x	5b	5g

Table 1: Study Participants

School	Location	LoLT Foundation Phase	LoLT Grade 4
School A	Township	English	English
School B	RDP	Setswana	English
School C	Northam local mine	Setswana /Afrikaans	English

Table 2: Background Information of the Schools

Primary Schools	Pseudonyms	Grade	Age	Gender	
				Boys	Girls
School A	Learner 1-10	4	10 year-old	5b	5g
School B	Learner a-j	4	10 year-old	5b	5g
School C	Learner i-x	4	10 year-old	5b	5g

Table 3: Biographic Information of Participants

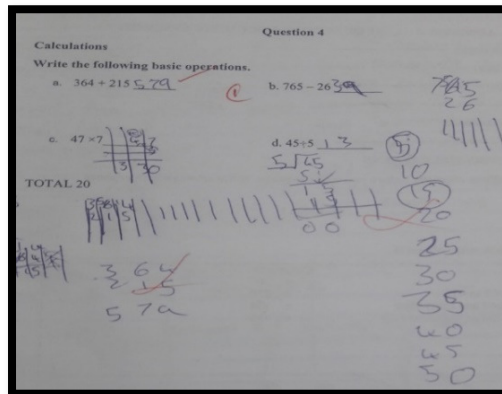


Figure 1: Learner 1 Response

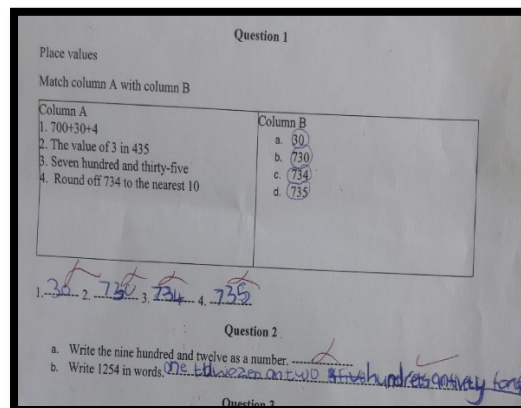


Figure 2: Learner 2 Response

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