

Teachers' Experiences on using Strategies to Teach Mathematics to Second Language English Speaking Grade 4 Learners in Selected Buffalo City Primary Schools

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Abstract

The purpose of this study was to investigate how teachers utilise strategies to teach mathematics to second language English speaking Grade 4 learners in selected Buffalo City Primary Schools. This investigation emanates from observations whilst teaching mathematics to second language English speaking learners at Intermediate phase. Grade 4 learners have a problem switching to English as the language of learning and teaching (LoLT) and understanding mathematical English. The outcomes of this investigation will benefit Grade 4 teachers in teaching mathematics to second language English speaking learners. A quantitative strategy guided this study. A descriptive survey design in the form of structured questionnaire was used to probe the component that is of importance in the teaching of mathematics, namely, utilisation of strategies to teach mathematics. Stratified random sample of 50 per cent of Grade 4 mathematics teachers in public and independent schools participated in the study. Data were analysed using descriptive statistics. Frequencies, percentages, and mean responses were used to make sense of the data. The study found that although they acknowledged that it was not an easy task, most teachers were confident in teaching mathematics to second language English speaking learners. The teachers used several different strategies to teach mathematics of which code-switching was the most prevalent. This shows that teaching mathematics in English to second language English speakers continues to be a challenge. It is recommended that the DBE should appoint teachers that are trained and qualified to teach mathematics to second language English speaking learners. The schools should also provide in-service trainings and provide adequate time for curriculum development within the schools. Teachers' experiences in teaching mathematics needs to be attended to as they are the mediator in the classroom between learners and mathematics.

Keywords: Strategies, Teaching Mathematics, Second Language Grade 4 Learners

1. Introduction

Mathematics is very important in our daily lives since it deals with the real-life situation in our daily activities (Do'stov, & Xolmirzayev, 2023). Students who are interested in achieving better employment

all over the world, need to have a thorough understanding of mathematics, because mathematics is not only essential but also an asset. This means that mathematical competence is an essential component in preparing numerate citizens for employment. It is also necessary to ensure that there is a continuous production of highly skilled people that are required by the industry science and technology (Manubag et al., 2023). However, challenges learners experience in learning mathematics in English as a second language are well-documented (Pun et al., 2024).

The Department of Education (2010) states that the Department's Language in education policy (LiEP) which was adopted in 1997 advocates the principle of maintaining the use of home language of learners as the language of learning and teaching (LoLT) in the classroom mainly in the early years of learning, while ensuring that additional languages are used later. The main challenge is experienced at the beginning of intermediate phase level, which is grade four, where English is introduced as a language of instruction to the young learners (DoE, 2010). Pramod and Kark (2023) states that English is the preferred medium of instruction in schools in South Africa because some indigenous languages do not have the linguistic complexity to enable them to be used in technical and scientific contexts. Kukulska-Hulme, Giri, Dawadi and Devkota (2023) note that "a major cause of education failure for many children is the use, in school, of a language that children are not familiar with". Jabborova (2023) observes that children learn better when they are taught through a language, they know well yet it is unfortunate that learners in Grade 4 in Buffalo City Metro are mostly second language English speaking learners who are taught mathematics in English. Ningsih et al (2024) argue that the mathematics performance of second language English speaking primary school learners is way below compared to their English and Afrikaans home language learners and therefore use of a foreign language as a medium of instruction disadvantages second language English speaking learners. The study, therefore, sought to find out how teachers utilise strategies to teach mathematics to second language English speaking Grade 4 learners.

2. Literature Review

Junnisa and Achmad (2023) define "teaching strategies" as the guidelines that the teacher use in the classroom to advance learning. It is the orientation that the teacher gives to his learners to interpret information when given mathematics task to develop them in different capacities. Strategies that are common in mathematics are cooperative learning, problem-based learning, use of manipulatives, use of code-switching, and the use of games (Deparon, 2023). They also add that other teaching strategies that are useful in the teaching of mathematics are integration of digital technology devices and real-life applications (ibid.).

Junnisa and Achmad (2023) further state that the relationship between the teacher and the teaching strategy that the teacher uses when he/she gives the mathematics task will have an impact on how the learners will receive it at the time that was used. It is, therefore, important for the teacher to consider carefully when selecting the strategies because it is this process that will help the teacher to be clear of his intentions to apply the selected strategy (ibid.). This means that the teaching strategy that the teacher uses when teaching will influence what is being taught and how the learners will receive it. This study then sought to investigate teachers experiences on using strategies to teach mathematics to second language English speaking Grade 4 learners in selected Buffalo City Primary Schools. For this purpose, the following question was tried to be answered:

What are the strategies employed by teachers when teaching mathematics to second language English-speaking learners?

3. Methodology

This study was guided by positivist paradigm because in this paradigm knowledge is believed to stem from experience and observation. Once the observational data has been verified through our senses, it becomes scientific knowledge, and this knowledge is held to be accurate and certain (Maksimovic & Evtimov, 2023). Thus, this paradigm is relevant to the current study which sought to investigate how teachers utilised strategies to teach mathematics to second English speaking Grade 4 learners in selected Buffalo primary schools. The positivist paradigm was adopted for this study because it is an epistemology from which human knowledge can be acquired which will also for deeper understanding of this research. This study used the quantitative research approach.

Yavuz (2023) defines quantitative as “a research strategy that emphasises quantification in the collection and analysis of data”. Quantitative strives to discover the answers to the questions that starts with how many, how much, and to what extent. That means it focus attention on measuring something or variables that exist in the social world. It also focuses on social aspects of behaviour which can be quantified and patterned (Yavuz, 2023). In quantitative research, the data is collected by using predetermined instruments such as questionnaires, although it can also be obtained through experiments. Quantitative research methods are characterised by the fact that data is subjected to statistical analysis. Research strategies in quantitative research tends to be structured and prescriptive and the outcomes of the research are largely expressed in numerical form (Kotronoulas et al., 2023).

For this study the researcher adopted a descriptive survey design. The descriptive survey design describes what is currently happening in the situation and is used to collect standardised information using the same instruments for all the participants and can be summarised using descriptive statistics (Kumari et al., 2023). This made the descriptive survey design suitable for this study. This design was suitable because the researcher used questionnaires to all the participants to describe which strategies they used to teach mathematics to second language English speaking Grade 4 learners, and which made it easier for the researcher to find precise results. The study was based on the population of 142 Grade 4 mathematics teachers selected from the public and independent schools in the Buffalo City Metro. A stratified random sampling was used for this study because it is a probability sampling. In stratified random sampling the study population that had a known probability was divided into subgroups or strata. In this paper, the study population of 142 Grade 4 mathematics teachers was divided into strata of 71 Grade 4 mathematics teachers. Table 1 below shows a stratified random sampling of Grade 4 mathematics teachers in public and independent schools in Buffalo City Primary Schools:

Table 1: Stratified Random Sampling of Grade 4 Mathematics Teachers

Type of School	No. of Schools	No. of Grade 4 Maths Teachers in Population	No. of Grade 4 Maths Teachers in the Sample
Public schools	186	120	60
Independent schools	11	22	11
Total	197	142	71

In this context, structured questionnaires were appropriate for this study as the researcher collected an in-depth information from Grade 4 mathematics teachers regarding their views on how they utilized strategies to teach mathematics to second language English speaking Grade 4 learners. Ranganathan and Caduff (2023) asserts that structured questionnaires consist of a set of standardized questions with a fixed plan, which clearly identifies the exact wording and order of the questions for gathering data from the respondents (ibid.). Furthermore, structured questionnaires are quick and easy to create, code and interpret. They are easy to standardize, for example, the same question is asked to every respondent in the same way. The researcher can therefore be sure that everyone has answered the same question in the sample, which makes a reliable method of research (Ranganathan & Caduff, 2023). The study used quantitative data analysis. The aim is to obtain usable and useful information. The analysis, whether the data is qualitative or quantitative, may describe and summarize the data, identify relationships between variables, compare variables, identify the difference between variables and forecast the outcomes (Kumari et al., 2023).

For the purpose of this study, data from structural questionnaire was analyzed using descriptive statistics. According to Alabi and Bukola (2023) descriptive statistics is the term given to the analysis of data that helps describe, show, or summarize data in a meaningful way such that patterns might come out from the data. To describe and make sense of the data in this study, frequencies were used and then expressed as a percentage. Frequency is the number of times an event occurred in an experiment or study (Chen et al., 2023). A frequency is used to categorize so that it can be interpreted in a visual way (ibid.). Percentage is one of the frequent ways to represent statistics. Percentage is calculated by taking the frequency in the category and dividing it by the total number of participants and multiplying by hundred percent (Chen et al., 2023). Descriptive statistics are broken down into central tendency and measures of reliability (Alabi & Bukola, 2023). For this study, central tendency was used. Central tendency is a single value that attempts to describe a set of data by identifying the central position within that set of data (Alabi & Bukola, 2023). The mean which is often called the average number, or average score is the most likely measure of central tendency (ibid.).

Mean is calculated by adding all the figures within the data set and then divide by the number of figures within the set (Alabi & Bukola, 2023). For this study, mean was used to calculate the average score of a set of numbers.

4. Discussion and Findings

In this section, findings were respectively presented according to the research problems.

What are the strategies employed by teachers when teaching mathematics to second language English-speaking learners?

Physical Objects

About 83,1 % (n= 59) of the respondents often use physical objects as a teaching tool to engage learners. This clearly showed that using physical objects was one of the strategies prominently used when teaching mathematics and as a teaching tool to engage learners. The teachers therefore were assisting learners to comprehend mathematical concepts more thoroughly. Sus (2024) research confirmed the importance of using physical objects in the mathematics classroom assisted learners to comprehend

mathematical concepts. In addition, physical objects also allow the learners to comprehend abstract concepts through concretizing them (ibid.).

Code switching

Pun et al (2024) assert that when English is a second language for both teachers and learners, they use their home language often as a learning resource to assist learners in explaining difficult concepts. About 90,2 % (n=64) of the respondents always use code-switching to assist learners in explaining difficult concepts. Code-switching was rated the most used strategy in the classroom by the teachers. This indicated that teachers were dedicated to ensuring that learners understood the mathematical concepts being taught.

Games

Games are activities that learners can be engaged in for fun. They also set the foundation for processes, thinking strategies and make existing thinking more effective (Boboqulov, 2023). The research found that 43,7 % (n= 31) of the teachers indicated that they sometimes use games. This means that teachers did not always make use of this technique. This is significant as the effectiveness of games as a teaching strategy is widely reported (Boboqulov, 2023). The use of games was rated the third strategy used in the classroom. This suggests that teachers are aware of the importance of games, however, it was not a strategy that was widely used in the classroom.

Cooperative learning

Cooperative learning was rated as the fourth strategy that teachers use in the classroom. About 36,6 (n= 25) of the respondents indicated that using cooperative learning as a strategy in the classroom is important. Cooperative learning is the strategy that includes group work in the mathematics classroom. It involves working together learners in small groups whereby they will help and motivate each other to carry out a task (Tamimy, Rashidi & Ling Koh, 2023).

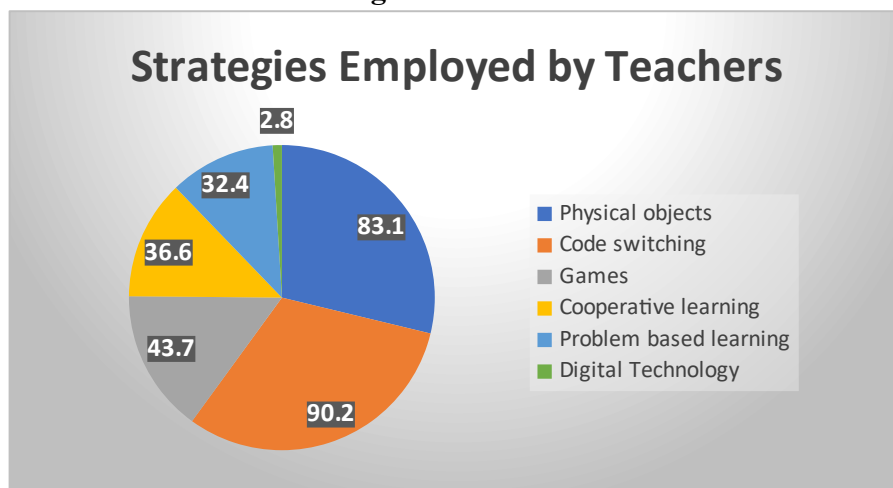
Problem based learning

Problem solving was also a strategy that teachers indicated they used in the classroom. This strategy was rated the fifth strategy used in the classroom. Approximately 32,4 % (n=23) of the respondents specified that they use problem-based learning every time in the classroom. Problem based learning (PBL) is the strategy done by small groups to solve problems (Anggraeni et al.,2023).

Digital Technology

Digital technology refers to digital tools such as computers, software, calculators, tablets, and internet (including mathematics related YouTube videos and mathematics games) that are used in schools and at workplace (Morris & Rohs ,2023). The data showed that only 2,8 % (n= 2) of teachers used digital technology in the mathematical classroom, and this was the least rated technique that teachers use. This raised some concerns and questions whether or not there were digital tools available in their schools to assist the learners in learning mathematics as well as the question around the teacher's own technological ability.

Figure 1: Results



5. Conclusion

The purpose of the study was to investigate how strategies were utilized to teach mathematics to second language English speaking Grade 4 learners in selected Buffalo City Primary Schools. The study followed a Positivist paradigm and employed quantitative strategies to seek an in-depth understanding of the issue from the point of view of the participants. A descriptive survey design was utilized as it allowed the researcher to describe what is currently happening in the situation under study. Stratified random sampling was used to select a representative of 50 percent of Grade 4 mathematics teachers in public and independent schools. Data was collected using structured questionnaires to collect in-depth information from Grade 4 mathematics educators regarding their views on how they utilize strategies to teach mathematics to second language speaking Grade 4 learners. To analyze the data, descriptive statistics were used. Frequencies, percentages, and mean responses were utilized to make sense of the data. It emerged from the research in the demographics of the teachers that the majority of them have Bachelors' degree or Honors degree. However, some of the teachers were in possession of lower qualifications such as Senior Primary Teachers Diploma and National Diploma as their qualification.

The study found that the majority of the teachers were aware of different strategies and how important they were in the teaching of mathematics. Teachers also used these strategies in making concepts understandable to learners. However, there were also few of few teachers that never used teaching strategies in the classroom. The study revealed that code switching was the most used strategy by teachers in the mathematics classroom and teachers acknowledged that they were important when teaching mathematics. Teachers also revealed that code-switching played a very important role in explaining difficult concepts. The use of physical objects was the second rated strategy used and they allow the learners to comprehend abstract concepts through concretizing them. The majority of teachers used Cooperative learning and problem-based learning concurrently in the mathematics classroom. In addition, teachers were aware of the importance of games, however, it was not a strategy that was widely used. Lastly, the use of digital technology was never used in the mathematical classroom, and it was also rated as the least technique.

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