

Teaching Mathematics in a School Where the Learners' and Teachers' Main Language Differs

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Abstract

The intention of this study is to explore mathematical discourse and teaching methods in Grades 6 and 7 of primary school in the Eastern Cape Province of South Africa. The school's student population changed from predominately white English/Afrikaans-speaking learners before the 1994 election to predominately black Xhosa-speaking students in 2004. The language of teaching and learning is strictly English, and most teachers cannot speak or understand Xhosa. Additionally, some Xhosa-speaking learners cannot clearly articulate their thinking and reasoning in English. The study demonstrates two mathematics classroom interactions and illustrates how language plays a pivotal role in classroom discourse. The findings of the study suggest that working with peers in Xhosa may facilitate learners' skills and development of conceptual understanding of mathematics. Furthermore, the study shows that requiring verbal discourse in the classroom to be only in English limited the learners' success in displaying their mathematical understanding, which in turn made them appear to be lower achieving than those who spoke only in English.

Key Words: mathematics learning, social interaction, culture, language, school community relationship

Introduction

“The road from the apartheid past to quality education for all South Africa’s children is long and complex” (Adler, 2001, p. 138). In the context of South Africa, prior to liberation, children were separated into four main racial groups. “Black”, mainly Xhosa-speaking in Eastern Cape, are descendants of African people. “Coloured” are racially and ethnically mixed. “Indians” are of Indian descent; “Whites” of European descent are separated into English- and Afrikaans-speaking (Stonier, 1998). After the 1994 election, demarcating the end of the apartheid era, 11 languages became official in South Africa. In the Eastern Cape, where the study was conducted, there are three main languages: Xhosa (pronounced kosa), English, and Afrikaans. The language of teaching and learning in most schools in urban settings is English. Although some Black parents who can afford it financially send their children to urban schools (formerly white schools), some parents do not believe that current integration recognizes their children’s cultural heritage. As Setati (2002) observes:

All language practices occur in contexts where language is a carrier of symbolic power. This aspect shapes the selection and use of language(s) and mathematical discourses. The different ways in which teachers and learners use and produce language is a function of the political structure and the multilingual settings in which they find themselves. (p. 18)

In South Africa, the *Revised National Curriculum Statements* (RNCS, 2002) urges problem-based learning, critical thinking, and written and verbal reasoning (i.e., mathematical discourse). However, since the 1994 election, many schools are unprepared to face the challenge of language when it comes to teaching and learning mathematics with understanding. Differences between teachers’ and learners’ languages make mathematical discourses difficult. Making the case even more complex is the school’s mandate that the learners communicate strictly in English. For example, a group of learners may engage in problem solving in their small group using their main language, although they are restricted from doing so. This communication among learners in their small group is inaccessible to teachers and may not be available to the class due to the language barriers from both sides. In this sense, mathematical discourse may be reduced to focusing on computational procedure rather than mathematical understanding that requires a clear articulation of a learner’s thinking and reasoning.

The purpose of this study is to understand and describe mathematical discourses and teaching methods in two primary grade classrooms, with particular focus on language as a medium for teaching and learning. The primary research

question is: What is the nature of discourse in a mathematics classroom where the language of teaching and learning is strictly English and where the teacher cannot speak or understand the learner's main language?

The School Background

The student population of this 128-year-old school changed from predominately white English/Afrikaans-speaking learners before 1994 to predominately black Xhosa-speaking learners by 2004. At the time when this study was conducted, the school enrolled 470 learners. About 90% of these children were black Xhosa-speaking, and about 10% were white. These numbers are constantly changing as more black learners and fewer white learners register each year. The language of teaching and learning is strictly English; technically, learners are required to communicate in English only, even amongst their Xhosa-speaking peers. Most teachers are unable to speak or understand Xhosa.

This transformation of black Xhosa-speaking learners coming into the school and white English-speaking learners leaving the school has complicated teaching and learning in terms of language, and this has become a primary focus of the school. In addition to the internal transformation, there are external complexities such as parental involvement, location of the school with respect to the homes of the learners, and the notion of communication with mostly Xhosa-speaking parents.

Limited communication between teachers/administrators and mostly Xhosa-speaking parents and pupils makes it difficult for parents to participate in their children's education. Another factor that has impact on parental involvement in school events is the issue of location and distance. Most parents do not live in the community where the school is located. The school interaction with the community and parents is limited to formal meetings called by school administrators. However, because of the school's good reputation regarding learning and leadership, Xhosa-speaking parents want to send their children to the school if they can afford to pay the school tuition fee.

Design of the Study

This observational and descriptive study is grounded in constructivist inquiry (Lincoln & Guba, 1985, 1994). Our data collection started in mid-January 2004 and ended in early May 2004. Data collection procedures consisted of preliminary and active phases.

The preliminary phase of the study began on January 15, 2004, and ended

on February 6, 2004. The purpose of this phase was to establish a research framework and to discuss and decide the following issues: (1) defining the research goals, (2) establishing a timeline for research activities, (3) contacting the school community (the principal and one 6th grade teacher) and sharing our intentions for the research, (4) targeting potential classrooms for observations (i.e., the intermediate phase and senior phase Grades 6 and 7 classrooms), and (5) clarifying the role of the researchers. We decided to select upper elementary classrooms because we thought we could find more Xhosa-speaking children in those classes who could communicate their thinking in English. The criteria for selection of principal, teachers, learners, and parents (i.e., interview subjects) included: (1) their willingness to participate, (2) their ability to articulate in English who they are, and (3) the diversity of their background (i.e., gender, age, home language, etc.). In this sense, all participating Xhosa-speaking learners and parents were able to express themselves in English.

The active phase of the data collection began on February 6, 2004, and continued through the first week of May. It included classroom observations (six observations: two observations of Grade 7 classes and four observations of Grade 6 classes); the teacher's reflection after each classroom observation; interviews with parents, learners, the Grade 6 teacher, and the principal, who was also a Grade 7 mathematics teacher; and making field notes of classroom observations. The two classrooms for observation were chosen based on the suggestion we received from the principal of the school. The two primary researchers were present during the whole course of the data collection procedure. The other three researchers played the role of auditors. All interviews were audiotaped and transcribed verbatim.

All observations occurred on Friday of each week. We based the selection of the day for our observations of the two classrooms on our negotiation with the principal about availability of time within the school schedule. We wanted to understand the relationship among the language of teaching/learning, teaching methods, and mathematical discourse. We had access to students' written communication during the small group work, and we were able to have one-on-one conversation with learners in English during classroom activities. However, due to our own limitation of not being able to speak Xhosa—the main language of most learners in both classrooms—we were unable to understand their small group verbal discussion in Xhosa. This situation created a significant limitation in capturing small group interactions among learners naturally. In this sense, we mainly captured mathematical discourses in English during the whole class discussion.

Research team members reviewed and analyzed data independently. This method provided a form of triangulation among the researchers (Denzin,

1984). Triangulation also occurred when the research report was shared with the principal and the teacher concerned. The compatibility between the researchers' interpretation and the participants' stated beliefs and actions evinced the trustworthiness of the data analysis.

Although data collection and initial data analysis occurred simultaneously during the course of the study, a synthesis across multiple data sources began when the data collection was completed. Constant comparative data analysis (Lincoln & Guba, 1985, 1994; McCracken, 1988) was used. Based on the emerging patterns, several categories were developed from the classroom observations, the teachers' reflections about classroom observations, interviews, and our systematic field notes. These categories describe classroom mathematics instructional strategies, the notion of language in mathematical discourses, and the voices of the principal, teacher, learners, and parents regarding educational challenges.

Description of Classrooms

The furniture arrangements of the two classrooms say something about the kinds of discourses being encouraged. The physical structure of the two classrooms (Grade 6 and Grade 7) was similar. In the Grade 7 class, learners were sitting around their table in pairs. Two tables were joined together to make a cluster of four learners sitting together as a group. The Grade 6 classroom was divided into two sections, the left and right sections. Each section contained nine tables organized in three columns with learners sitting behind each table in pairs. The number of learners in both classrooms was comparable: 35 learners in Grade 7 and 34 learners in Grade 6. As noted before, the vast majority of learners were black Xhosa-speaking, and English was their second language. Both teachers' main language was English and the language of teaching and learning was strictly English.

The method of mathematics instruction in both classrooms was similar. For example, for numbers and operations, the major goal for both teachers was speed and accuracy in producing a correct answer. In this sense, the nature of interaction between teacher and learners mainly focused on how to calculate and produce right answers (i.e., computational understanding). Our classroom observations suggested that the focus of mathematics instruction and discourses did not afford the learners conceptual understanding of mathematical procedures. In what follows, we describe a sample of mathematics classroom discourses, one from each classroom (grade), to demonstrate the instructional strategies of two teachers and the social interaction between teacher and learners and among learners.

Seventh Grade Mathematics Classroom

The focus of mathematics content was on multi-digit long division. In this episode, “T” stands for teacher, “L” for learner, “Ls” for learners, and “R” for the researcher. The first activity focused on speed and accuracy.

T: Open your book on page 12. [Learners followed the teacher’s instruction and quietly worked on long division problems on page 12 from their textbook. The teacher wrote on the board “Long Division.”]

Learners worked on the problems individually. After about 15 minutes, eight learners went to the board, one by one, and wrote their names on the board, thereby communicating to the teacher that they had finished the task. The teacher used this strategy to encourage learners to complete the assignment quickly and accurately. Speed and accuracy were very important to the teacher. He said that if a learner gets all the answers right s/he receives a good mark.

During the individual work, the teacher walked around observing with minimum interruption. When the first eight learners had written their names on the board, the teacher started going over the answers of the problems.

T: Okay, listen carefully to the answers and check your answers. Number one, the answer is 10... [He continued reading the answers for all the problems and learners checked their answers.] What I want you to do is this. [He wrote on the board “34,632 divided by 36” with a long division symbol.]

Learners were allowed to work in pairs or groups of three or four. The interview data suggest that the teacher’s intention was to build the learners’ confidence by allowing them to support each other. We observed some learners working individually while some other learners were engaged in genuine collaborations quietly using their main language, Xhosa. Some learners were working in pairs checking their answers, while some others were just copying their partners’ solutions without any challenges or questions. One of the researchers interacted with some learners in an attempt to understand their thinking and reasoning of multi-digit division problems.

R: I see that you divided 34,632 by 36 and came up with 962. How did you solve the problem?

L1: I started with 346. Nine times 36 is 324. Then I got 223. Thirty-six goes to 223 six times. I got 72, and 36 goes to 72 two times, and I got 962.

The teacher presented another long division problem: 10,660 divided by 52. We asked some other learners about their solution procedures for this particular problem.

R: I see you divided 10,660 by 52 and came up with 205. How did you get the answer?

L2: I don't know. I just got it from him [referring to his partner].

L3: I got this [showing the answer 250 for 10,660 divided by 52].

R: How did you get that?

L3: [He paused with no answer.]

Some learners were able to communicate their computational procedures with us. Some could not elaborate their thinking. Some would just copy their partner's solutions without any questions. The teacher walked around the room, helped some learners, encouraged some to ask their partners for help, and presented more long division problems to those who solved the previous ones accurately.

The next activity we observed was word problems. From our field notes, we found some learners having difficulty reading and comprehending the questions. For example, one problem stated: "A book has 116 pages. How many pages would there be in 505 such books?" A Xhosa-speaking learner was trying to understand the problem. She raised her hand.

L2: I don't understand the problem. [Asking the researcher who was walking around the room.]

R: Okay, it says [Read the problem out loud]. How do you understand this problem?

L4: So, I have to multiply? [She was not sure.]

R: What are you multiplying?

L4: Multiplying 505 x 116.

R: Why are you multiplying 505 x 116?

L4: Because each book has 116 pages and there are 505 books.

R: Okay, does it make sense to you?

L4: Yes, it does. [When we asked for more elaboration of her reasoning, she smiled and repeated her solution procedure.]

The mathematics lesson lasted for about 50 minutes. The teacher's instructional strategy followed a similar pattern for the next mathematics activity we observed. He would start with exercises on routine computational problems for speed and accuracy. Then a few more difficult problems would be presented and learners were encouraged to work together (i.e., building learner's confidence). Lastly, they would practice word problems from their textbook either individually or in pairs.

The teacher had a very calm voice and spoke softly and eloquently. He would use few words to communicate his intention and instruction with the learners. His mathematical objective focused on computations for getting right answers. Our interview data suggest that one reason for emphasizing procedure for short numerical answers was because the method allowed the teacher to regulate mathematical discourses. Another reason was that by using a skill-based

approach, both teacher and learners could avoid the problems of language and mathematical articulation.

One thing that was very striking to us was the language and communication. On the one hand, the teacher could not speak Xhosa. That put him in a very disadvantaged situation in terms of understanding some learners' thinking and reasoning during the small-group work. On the other hand, lack of fluency in English limited some learners' abilities to elaborate their thinking.

R: We observed that some learners had problems understanding word problems in English and communicating their thinking with us in English. We also observed that during small-group work they spoke Xhosa with one another.

T: I think you raise some very good points for me to reflect. Last year I had a group of learners in my class that I worked with from Grade 6 and then 7. It was easier to establish roles and expectations with them. I am trying to find ways to help this new group in this seventh grade class. Sometimes they have problems with the English language. In my class, I don't allow them to speak Xhosa. They ought to speak English. But I know in their small group they speak Xhosa.

Our interview lasted about 30 minutes. We found the principal/teacher to be a reflective person who seemed to value his own ongoing learning and wanted to improve his teaching in terms of content of mathematics and pedagogy. He recognized the challenges in his school, particularly the language issue, and was searching for ways to cope with it adequately.

Sixth Grade Mathematics Classroom

In one of our observations, the focus of the mathematics lesson was on numbers and operations. The teacher spoke fast and was active in the classroom. Her method of instruction was similar to the Grade 7 teacher's strategy regarding speed and accuracy for numbers and operations.

T: Okay, are you ready? Write down the answer as accurately and as quickly as you can.

Learners worked on the exercises. Ten learners went to the board, one by one, and wrote down their names.

T: Okay, let us go over the problems very quickly. Alright, what would the answer be...listen carefully, first one?

Ls: Less than.

T: Number 2?

Ls: Greater than. [They continued going over the answers for all 19 problems.]

Our interview data suggest that the intention of the first activity, from the teacher's perspective, was for learners to master basic number operations quickly and accurately. The second portion of the classroom activity focused on small-group work for solving numerical problems and listening to multiple perspectives on problem solving.

T: Okay, one person does the recording. I am going to give you the instruction for your group work. As a group, I would like you to find a solution to this addition problem using two different methods. [She wrote " $372 + 428 =$ " on the board.]

Learners were talking amongst themselves and one individual in each group was recording the group solutions. Although the learners were not allowed to speak Xhosa, some groups were speaking Xhosa quietly among themselves and some others English. Due to our own language limitation, we could not understand the mathematical discourses amongst the Xhosa-speaking groups. The teacher walked and observed different groups. She could not understand the Xhosa-speaking mathematical discourse either, and this language limitation affected her interaction during the classroom discussion. Additionally, some Xhosa-speaking learners were limited in expressing their thoughts in English.

T: It is not the reporter's responses but the whole group's work. Okay, in how many different ways did you get the solution?

Ls: Two ways, three ways, two ways. [She called a learner.]

T: [Learner's name.] Come and show us how your group solved the problem.

L1: [She went to the board and wrote " $372 + 428$ " in two rows and added them.]

$$\begin{array}{r} 372 \\ + 428 \\ \hline 800 \end{array}$$

[For the second approach she wrote:] $300 + 400 = 700$

$$70 + 20 = 90$$

$$2 + 8 = 10$$

$$800$$

Ls: She is very clever.

T: Okay, give us another one.

L1: [She wrote quietly " $2 \times 400 = 800$."]]

T: How do you get that?

L1: [She paused. The classroom was silent and learners were carefully listening.] Because two times 400 is 800.

T: Yes, but I want to know how you thought about it?

L1: [Silence; no answer. The teacher called several learners for their solutions.]

The learner (L1) presented her group's solution in three different ways. As we observed this small group, they communicated their thinking for reaching a consensus in Xhosa. However, when asked by the teacher to explain her reasoning in English, the child was mostly silent, presenting her solution symbolically. This condition reduced the mathematical discourses to the manipulation of symbols and computational discourse.

We talked with the teacher after the classroom observation about the issue of language and mathematical discourses. She mentioned that some learners struggled to express themselves in English, which made teaching and learning more challenging. According to her, she used cooperative learning as a pedagogical strategy to help lower-achieving learners. She continued by saying that because of language barriers and the learners' background, she faced all kinds of discipline problems, which made her teaching frustrating and sometimes unbearable.

The Grade 6 classroom was different in some interesting ways. Although the furniture was set up into a more controlling arrangement (unlike the Grade 7 classroom, which was arranged in discussion groups format), the divergent question of "how many ways" was asked in the Grade 6 classroom. The teacher used cooperative learning and open-ended questions as her pedagogical strategy to help all learners. However, due to the language issue and her concern about discipline problems and classroom control, she required that learners not use Xhosa as a medium for mathematical discourses, even amongst their peers in the small groups. This contradiction between her cooperative learning method and her classroom control was one of the major dilemmas she faced throughout the study.

We found the teacher sincere, open, honest, and easy to talk with. She was searching to find ways to reach all learners. She took her teaching profession very seriously and took great pride in being a teacher.

Coping with Challenges

From our classroom observations and interviews, we identified two major challenges that the school faced, namely the issues of language and teaching methods. In what follows, we describe our understanding and interpretation of issues raised by the participants.

Teacher's Voice

Two important challenges for both teachers were finding teaching strategies they could use to help all learners to do mathematics with understanding and the issue of language. The school used its old curriculum for mathematics

teaching and learning. This mathematics curriculum focused heavily on mastery of computational skills with less emphasis on conceptual understanding of mathematical procedures.

The second challenge for the teachers was the language barrier of some learners and the issue of communication. “The children struggle with problem solving because they do not comprehend them. Even if it’s maths, if they don’t understand the problem they cannot solve it,” said one teacher. On the one hand, both teachers wanted to incorporate problem solving and facilitate learners’ conceptual understanding. On the other hand, the language limitation between the teacher and most learners made it difficult to promote mathematical understanding. This difficulty often reduced mathematical discourse to short numeric responses without reasoning. Even worse, sometimes it created frustration and anger for both learners and the teacher. “I am here to facilitate and I can only facilitate if they cooperate. If they do not cooperate, I cannot do my job, and that’s very important to me,” the teacher said.

Connected to the issue of language is communication between parents and teachers. Cooperation from parents is not so good. We have to continually write in the diaries that the children have not done their homework. Please help, the child has left his books at home, please send the book.... We are pushed for time and I think mainly because we have to discipline them. (Grade 6 Teacher)

Teaching for many years, both teachers found it more and more difficult to face the challenges of educating young children in a rapidly changing society. The educators were concerned about young teachers entering the profession. They were not certain whether those becoming teachers would be adequately prepared for facing new multilingual classrooms. The differences between the teachers’ background and their learners’ home environment were forcing the teachers to find new strategies for facing the challenges of communication and language differences.

Principal’s Voice

The principal believed that language barriers were partly responsible for Xhosa-speaking parents’ lack of participation. Another factor he mentioned was the location of the school. “They don’t live in this community; they live right on the other side of town. So, that’s the kind of community we are serving,” he said. In coping with the home and school relationship, he had tried to involve parents in terms of homework and other areas, such as the academic progress of the child and sports events. His other strategies included personal interviews with every parent and going through the school roles and expectations with them. “I tell them, don’t send your child to this school if you can’t

support your child in this way [following school's rules and expectations] because you and I will be frustrated with each other," he said. He mentioned that the biggest challenge related to the language issue was the fact that more white parents were taking their children out to schools that were still holding out as long as possible to stay white. "To teach Xhosa children in English when there are so few English-speaking pupils is very difficult," he said.

Learners' Voices

Learners' voices address their views of mathematics and its importance. They said they liked the school and their teachers. They believed the school had good facilities that provide them the best educational opportunities. They said education was very important to them because, according to one, "without it I cannot be successful in my life." They defined mathematics as numbers and manipulations (i.e., calculation and production of accurate results).

L1: Numbers, lots of numbers.

L2: It's when I'm dealing with numbers, like when someone's working in a shop and you have to give change.

L3: You have to know how to multiply, divide.

The above definitions were consistent with what they experienced in their classrooms. The learners' attitudes towards mathematics were positive to a degree.

L1: Maths is okay to me; it's not that it's a very nice subject. It is not boring. I'll do it.... There are some subjects that I like and some I don't. Maths is in the middle for me.

L2: Sometimes, I feel why must we do maths at school? And sometimes I feel if I have learnt something and I know it, then I am excited.

L3: I think it's a great subject. If you want to be an architect, you have to know maths.

Overall, the participating learners liked mathematics and wanted to do well in it. They believed the school was preparing them for a better future.

Parents' Voices

All parents were supportive of the school and the way it had been functioning in terms of quality of education, teachers' commitment, and good leadership. Through our interviews with parents, the issues of culture and language emerged. The parents recognized the school's effort to bring children together in terms of understanding and respecting each other's culture. They appreciated seeing children living and learning together.

Our children have different cultural backgrounds. There is Xhosa and various others. There is a lot of respect for those differences. This school

used to be a white school. I am sure that it was a difficult period of adaptation. But I can see that they have welcomed everyone at this school with open arms. (Parent)

The parents acknowledged the leadership strategy for valuing learners' cultural heritage such as children dancing together on the stage, singing together, and playing various sports cooperatively. The participating parents, however, stated that the school needed improvement in terms of language diversity.

The school teachers can also represent each and every learner in terms of culture, race, and language. Presently, it's only white teachers who are speaking English and Afrikaans and that is all. Most learners' language is Xhosa, which is not spoken by the teachers. (Parent)

Some parents expressed their concern about the language and communication among learners as well as teacher and learners.

In my child's class, English-first-language-speaking pupils are a minority, and, as I said, Xhosa is a predominant African language in our province, and it is important that our children and ourselves are on a social level to be able to act and communicate with everybody. (Parent)

Although the participating parents were supportive of English as a common way of communicating in the school, they thought other languages, such as Xhosa, were important for students to learn. The parents hoped that through educational process and cultural programs, their children would become more tolerant and respectful of each other's culture.

Discussion

Many of the intricacies of school transformation remain unknown. Little is known about how educators experience and lead complex change in an organizational climate in transition, in a milieu that is historically, socially, and culturally different from what they had experienced before. Additionally, less is known about how educators implement a new curriculum and instruction contrary to what they used to know and apply. It remains uncertain what kinds of teacher knowledge are necessary to support and facilitate learning mathematics in a setting where the main language of the teacher and pupils differs and where the language of instruction and teaching methods makes it difficult for mathematical discourses that promote conceptual understanding. As Setati and Adler (2001) assert:

There are numerous, distinct mathematical discourses that require navigation at the same time. *Moving between language and discourses* in moments of practice is a significant challenge for mathematics education

research and practice. These arguments arise out of the South African context and have specific relevance in the current educational debates in South Africa. Multilingual mathematics classrooms are, however, an increasing urban phenomenon in many other countries. (p. 244)

Given the diversity and complexity of classroom culture, it is unclear how leaders communicate a transforming curriculum with parents and the community they serve. Making the task even more complex is the challenge of engaging parents to participate in, and contribute to, the school's activities and events, particularly when the language of the parents is different than that of the school.

Poor performance of bilingual learners thus cannot be attributed to the learner's language proficiencies in isolation of wider social, cultural and political factors that infuse schooling...Hence the need in mathematics education research to examine classroom practices where the bi/multilingual speaker (as opposed to the monolingual speaker) is not only treated as the norm, but his or her facility across languages is viewed as a resource rather than problem. (Setati & Adler, 2001, p. 245)

The study illustrated the depth of challenges for transforming mathematics instruction in a primary school in the Eastern Cape Province of South Africa. The main challenge in the two mathematics classrooms for facilitating conceptual discourse was language and teaching methods. The issue is not whether the two teachers promoted conceptual discourses in their classrooms or did not. The challenge was how to promote and to connect mathematical conversation for reasoning and interpretation when English, as the only language of teaching and learning, was different from the learner's main language (i.e., Xhosa). Additionally, how can an English-speaking teacher understand and facilitate mathematical learning of learners when s/he is unable to understand mathematical discourse in Xhosa during the small-group interaction? As researchers, we felt the same dilemmas during our observations and interactions with these learners. "In bi/multilingual settings, the challenge becomes a three dimensional dynamic. It simultaneously entails access to the language of learning (English in the South African or USA context), access to mathematical discourses, and access to classroom discourses." (Setati & Adler, 2001, p. 248)

The findings of the study suggest that working with Xhosa-speaking peers may facilitate learners' skills at getting correct answers and their development of conceptual understanding. Requiring verbal discourse in the classroom to be only in English may have limited the students' success in developing or displaying mathematical reasoning, which may have made them appear to be lower achieving than those who spoke only in English. In this sense, mathematics

teachers might encourage more student-to-student interaction during whole-class discourse, some of it in Xhosa, to facilitate the other learners' and teacher's understanding of a particular learner's mathematical ideas. This teaching strategy is drastically different from simply asking peers to translate from Xhosa to English or vice versa for one another. This teaching strategy creates a new challenge for English-speaking teachers to learn and understand Xhosa so that they could connect with learners' thinking and reasoning.

Closely related to the issues of language and mathematics classroom discourse was the relationship between the learner's home and the school. The school and the community relationships limited parent-teacher communication and in some instances created various obstacles such as frustration, disappointment, discipline problems, and even, in some cases, anger. Perhaps more educational and professional development programs, supported by the government, will prepare educators to cope with this challenge. On the local level, a possible strategy could be for the school to invite parents to volunteer to participate in and contribute to the educational activities of the school. In this way, parents may share their cultural and educational experience with learners and teachers.

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