CHAPTER SIX

A multi-bilingual approach to teaching Foundation Phase numeracy

Margie Owen-Smith

Background

All of South Africa's 11 official languages are represented in Gauteng, the province in which the Johannesburg Metropolitan Area is located. Gauteng's language mix is further complicated by an influx of immigrants from other parts of Africa, Zimbabwe in particular. In many of its township areas, the inherited apartheid pattern of ethnic separation remains largely unaltered, with separate schools for different language groups sometimes only a few blocks apart, or even side by side.

For the first three years (Foundation Phase), national policy recommends that the home language should be used as the Language of Learning and Teaching (LoLT). In Grade 4 the LoLT changes to English but, to a greater or lesser extent, teachers unofficially continue to use the originally designated home language orally because the majority of learners are not ready to cope in English. The spatial separation of language groups in these schools continues in effect for the remainder of the primary years (through Grade 7) and often into the high schools in the area.

On the other hand, schools which were for white learners only under apartheid have become multiracial and multilingual but have mostly remained English-medium from Grade 1. The subject of this study, Sunshine Primary (a fictitious name), was a school of this type.

Even many previously Afrikaans-medium schools in this category have changed over to English as LoLT.

Aim of the 30-month pilot study

The aim of this study was for the Home-Language Project (HLP)[1] to develop and test a minimal multi-bilingual intervention in primary school numeracy/mathematics using seven or more home languages simultaneously. It was a part of a broader HLP programme (spanning Grades 1 to 10 in five schools) looking for practical and cost-effective ways to counter language disadvantage where, despite the presence of a wide range of other languages, only one LoLT is being used. An important aim of this programme was to find solutions involving a minimum of separation of language groups in order to promote social cohesion and explicitly reject the apartheid connotations of separation.

The research hypothesis

It was postulated that several home languages can be used simultaneously in a multilingual Foundation Phase classroom, alongside an agreed common language, to provide an effective and practical resource for the teaching and learning of numeracy.

The choice of an Action Research approach

This research approach was chosen to allow for development and testing to move hand in hand, continually responsive to feedback. It also allowed for class teacher participation in the development of the teaching model in order to draw on their classroom experience and to encourage their commitment. It was also intended to provide an opportunity to invite outside researchers to make their own observations, set and evaluate their own hypotheses and contribute feedback for the ongoing modification of the model as well as the final assessment of its operation. In fact, only Professor Mamokgethi Setati, then at Wits University, took up this invitation, supervising

1 The HLP is a non-profit organisation that was started as a collaborative project in 2001 by the governing bodies of six English-medium schools in Johannesburg. Their aim was to provide home-language support for their learners while seeking a replicable way to address the language disadvantage of second-language learners in other multilingual schools in South Africa.

the work of an MSc student whose independent assessment of the mathematical practices resulting from the working of the model proved to be extremely valuable for our study.

Limitations set by the school

The intervention was limited to one double period (2 x 30 minutes) a week. This met the criterion that it should not risk being perceived as disrupting delivery of the official English-medium curriculum. Other criteria for what the school considered to be a practical intervention were that it should fit in with current timetables and schedules, and that it should not significantly increase teacher workload, result in learners missing work being done in the non-study classes or cause parental concern that learners' English might suffer.

Selection of the study school

Sunshine Primary was chosen firstly because its principal had invited the HLP to investigate his school's low levels of reading proficiency early in 2004. He enthusiastically supported the idea of longitudinal research following classes from Grade 1 through to Grade 7. He was convinced that his school's chronic underperformance in both reading and numeracy/mathematics was primarily due to the use of English as the single language medium from Grade 1 despite the fact that it was not a home language for the vast majority of its learners.

The demography of this school had changed from being whites-only to almost all-black over a period of 10 years. Other aspects that made it suitable for the development of a nationally replicable model were its class sizes (40–45) and levels of teacher absenteeism (unacceptably high) and parental income (relatively low). As an inner-city school in the commercial centre of the country, its learners reflected not only all 11 official language groups but also a scattering of several other African languages including West African French.

The school classified the 2005 total of 1 064 pupils as 3.4% Coloured, 0.65% Asian, 0.56% White and 95.4% African. The teaching staff comprised 44% African, 15% Coloured, 15% Asian and 26% White. Almost 70% of learners had isiZulu as their home language. Both Afrikaans and isiZulu were offered as second-language subjects from Grade 3 to Grade 7. English was the LoLT and all learners also studied English as a subject.

The selection of study classes and teachers

There were four classes in each grade. It was initially decided to focus the study around three research classes. A 2005 Grade 3 class was to be followed for the full study period to the end of Grade 5 in 2007, a Grade 2 class followed through Grade 4 and one of the current Grade 1s would be included as Grade 2 in 2006 and followed for two years to the end of Grade 3. The intention was thus not to confine the study to the Foundation Phase, but also to look closely at the potential contribution of using the home language as a resource beyond the initial three years of schooling.

The other three classes in each grade (Grades 2 to 5) were to act as control groups. Their teachers were all kept broadly informed of the approach being taken in the research classes and the rationale behind the study but, apart from the HLP's input into reading workshops (English) for all teachers during 2007, they were not included in any training or work on the development of the multi-bilingual model.

Volunteers were called for amongst the eight Grade 2 and 3 teachers. Two were selected from the volunteers on grounds of language so that we could test the approach with an English speaker who had no African Language (Teacher E) as well as an African Language speaker (Teacher A). The Grade 3 teacher (Teacher A) had Sepedi as a home language, could communicate orally in both Sesotho and Setswana and use a little isiZulu, but could not use the other five official African languages. From the beginning of 2006, however, Teacher A was specifically requested not to code switch during the study lessons. Both teachers then used the model as mono-lingual English speakers. The reasons for this are discussed later in this chapter.

The school's basis for allocating learners across each of the four classes in a grade was to obtain a roughly equal proportion (i) of boys and girls, (ii) across the seven languages spoken (on average), and (iii) between very weak or strong learners (according to the previous year's results). Thus, our call for volunteer teachers resulted in study and control classes which displayed a typical school profile as well as amounting to a random selection process.

By the end of 2005, it became clear that new internal school issues would make it difficult to follow Grade 3 classes intact into Grade 4, and it was agreed that the study would have to confine itself to the Foundation Phase. This meant that the only research classes that

could be followed into their next grade were the Grade 1s of 2005 (only picked up by the study in 2006 as Grade 2) and the Grade 2s of 2005. With the implementation of the study having been delayed until the third term of 2005, we were thus finally only able to work with one research class over a full two years. The two-year research class was Grade 2 to 3 over 2006–2007.

Research class language profiles

As was typical in the school, each of the study classes had a different scattering of languages. The profile of the two-year study class with its nine/eight languages (2006–2007 Grade 2 to 3) is shown below:

Table 1 Language profile for the two-year research class 2006–2007

	Zulu	Xhosa	Sotho	Pedi	Tswana	Venda	Ndebele	French	English	Total	Core group
Grade 2 2006	17	5	6	5	2	1	1	3	1	41	35
Grade 3 2007	17	4	3	6	4	0	2	3	1	40	35

Note: A core group of 35 were common to both years – five new learners joined in 2007 replacing six who left the school at the end of 2006.

Approach to the development of the model

Premises

The HLP was invited into this particular school because of its guiding principles, viz.:

- Language should be empowering for all language groups and not disadvantaging for any.
- Language should unify people and not divide them – a multilingual social situation requires a teaching solution that promotes social cohesion.
- Learners need a home language base to enable proficient learning of a second language (e.g. English), and, in South Africa, they need English to maximise post-schooling opportunities.

From these, the Project has derived its multi-bilingual approach, aimed at every learner developing and using two strong working

languages (the home language and an agreed common language) to support lifelong learning.

Thereafter, the Project maintains that all South African learners also need a third language for purposes of social communication, but that either extra-mural time or an extension of the official school time has to be made for this. The focus at this stage has to be on getting the two central languages to the level of proficiency required for successful education across the curriculum. The necessary time and expertise have to be provided for this.

The HLP maintains that a central function of any lesson is to teach pupils to think, so as to prepare them to become self-directed and self-reliant learners for life. We emphasise the value of verbalisation for learners as a resource for promoting such thinking, with bilingualism adding further value through the metalinguistic awareness arising out of talking, reading and writing about the same ideas in more than one language (Vygotsky, 1987). Even more value can be added by using translanguaging practices (Williams, 1994, cited in Hornberger, 2011) in which learners use more than one language in pursuit of a task. This allows teachers to draw on learners' own communicative resources to facilitate successful learning (Hornberger, 2011). These resources include the critically important mesh of common words which are still needed for the understanding and development of specialist discourse (Mammino, 2010).

Needs analysis

The Principal's assertion that language was a key problem holding back the development of reading skills was borne out in 2004 by the HLP's empirical observations and corroborated by initial tests carried out independently by the Read Educational Trust (Matthee, 2005). These were part of an HLP study set up in collaboration with the Gauteng Department of Education (GDE) to observe the effects of home language support on the acquisition of English literacy. The current (2011) Gauteng Province Literacy Strategy bears witness to the belief that literacy is at the core of learner underperformance across the curriculum.

A series of observations of numeracy classes early in 2005 clearly demonstrated the inadequacies of using English only for teaching numeracy. However, they also exposed a classroom pedagogy in

which teaching was seen primarily as a process of transmitting information to passive learners. This pattern is ubiquitously African, seen for example in the Threshold Project in the 1980s (Macdonald, 1990). Silence was the preferred mode, to allow the teacher to do all the talking and for learners to get on with routine exercises that reinforced a pattern. The aim was to be as quick and neat as possible, with faster learners being rewarded with time for illustrating and colouring in their exercise books. Problem-solving tended to be avoided because "it takes up too much time even though we know it would be a good idea" (this was stated by Teacher A and agreed with by Teacher E). Teacher A responded to a query about whether she ever allowed learners to work together with the view that this "would just lead to copying and make assessment difficult". Attempts at discussing solutions mostly became conversations between the teacher and a few faster learners with the rest of the class becoming alienated and bored or unruly, bearing out Sfard's contention that not all mathematical conversation is good for mathematical thinking (Sfard et al., 1998).

For learners to be able to use language as a resource which can in itself promote learning, teachers needed to be able to use learner-talk as a teaching instrument. For such talk to be efficiently focused, we aimed to have it anchored in text, and learners therefore had to be able to read at least the basic instructions. If a child was to use both her/his languages (home language and English), s/he had to be able to read both and parallel-language text had to be provided. This meant that the model would initially have to accommodate currently inadequate reading and vocabulary levels in both languages while promoting these skills. Home-language reading would present a particular problem as some learners had had previous exposure to home-language text through the HLP pilot started in 2004, this amounted to very little. Both research classes were therefore also allocated a weekly 30-minute home-language reading period to be taught by the HLP's two reading assistants.

Base-line testing

A number of efforts to get funding for independent base-line numeracy testing were unsuccessful. It was therefore decided to work with the GDE's annual Numeracy Challenge results for this purpose.

This provincial test was administered in September/October 2005 shortly after the study began in July/August. It was hoped that it would provide an independent annual indicator of the effects of the intervention within a provincial perspective.

The Grade 1 class, the core of which went on to become the two-year study class (Grade 2 in 2006 and Grade 3 in 2007), achieved the lowest of all four Grade 1 classes in 2005 (34%). The Grade 3 class, taught by Teacher A in 2005, achieved 14% in this test – the second lowest of the four Grade 3 classes. See table 2 below.

Table 2 The Gauteng Department of Education's Numeracy Challenge 2005, Sunshine Primary School

2005 base-line test	Grade 1	Grade 2	Grade 3
Average of all four classes in each grade	45%	37%	15%
Range of class averages within each grade %	34–54	27–44	13–17
Teacher A			14%
Teacher E		44%	
Class which became the two-year study class 2006/2007	34%		

Class–teacher participation

The teachers taught the once-a-week multi-bilingual class with the HLP observer sitting at the back of the classroom. As agreed, the three then found a time after school to reflect on the lessons and to discuss ideas on how the model might need adaptation. In this way, the original draft model was significantly modified over the course of the two years – particularly in the first six months. Material for the next lesson was also discussed and selected during these meetings – to make it possible for the HLP to handle the photo-copying of the parallel-language text in advance.

Removal of teacher code switching as a variable

At the beginning of 2006, Teacher A was requested not to use any African language in her lessons. What had been noted up to this

point was that teacher code switching presented a complex set of advantages and disadvantages, affecting language groups differently. The most serious disadvantage was not the obvious one relating to the teacher's lack of equal proficiency in all the languages being used, but that learners were less ready to re-read the text and argue about meaning with their same-language partner ("language buddy") where they felt they could rely on an explanation from their teacher in their own language. Teacher code switching was thus viewed as detracting from the learner independence aimed for in the model design. The subsequent removal of this element explicitly adjusted the model to promote learner code switching while discouraging this practice for teachers, as was done in the Communicational Teaching Project in Bangalore 1979 to 1984 (Prabhu, 1987).

The main ingredients of the teaching model

The weekly intervention used a double period (2x 30 minutes) and. as it was intended to address both numeracy and literacy, it was called a maths-language development (MLD) class. Multiple outcomes were sought, not just for numeracy but also for literacy, even though the focus for this study was on the former.

The teacher's introduction of each lesson was intended to provide a link with the previous lesson without reducing the cognitive demands of the exercise. Learners then had to grapple with the instructions and questions presented in written text, before moving into the problem/s which required the application of concepts and algorithms taught in previous lessons.

The exercise/problem was photocopied (from an existing text-book series available in all 11 languages) to allow for parallel-language text with the home language on one side and the English equivalent on the opposite side of a single page. The task of handing out the correct language combination was enjoyed by language monitors amongst the learners.

The use of learner-talk as well as learner engagement with text to promote deeper level thinking was central to the model. For this, learners were seated in language groups and each learner allocated a same-language partner (language buddy). Buddies were explicitly exhorted to work together using their home language "because two languages give you two ways of understanding". Their bilingualism

was presented as a wonderful advantage. Pairs were selected to make it possible for a stronger learner to help a weaker partner. Where pairing was not possible, a three-buddy team could work together. Where a child had no language partner, someone in the same language family could fulfill the role or the child could make up an English buddy team. A pair with different West African languages used a mixture of their own languages, French and English in their learner-talk to grapple with the problem. They followed this up with the English-Zulu homework translation exercise in Stage 4 (below), to help them learn isiZulu. The pattern of the lessons proceeded through the following four stages:

1. *Teacher introduces lesson in English* – asking a spokesperson from each language group to announce the title of the exercise in that group's language, and then, with minimal teacher talk, proceeding to link it to relevant previous work.
2. *Learners work in their various home languages* – reading the text together (describing the problem and providing some instructions) in same-language pairs (language buddies). They have to read it first in the home language and then to check their understanding by reading it in English as well; to think about its meaning and if necessary to go back and re-read the necessary parts again; to discuss it together using their home languages, agreeing or disagreeing with each other on how it should be done, and then solving the problem and showing their work in writing.
3. *All change back to English* (after about 30 minutes) – to allow the teacher to correct the work done while getting learners to articulate their thinking and defend their strategy in English.
4. *Before the teacher selects a buddy pair to give their explanation to the class, learners are given a few minutes to practise their English explanation on their buddy.* This not only ensures that all learners have to make some attempt to verbalise their thinking about their work, it also gives them the chance to help each other phrase this thinking in English. The teacher's role is then to interrogate, revoice, simplify and model anything about the responses that might help the class understand the numeracy concepts as well as the English vocabulary.

5. *Learners are given homework based on the lesson* – to reinforce the numeracy outcomes through a specific numeracy task. A translation exercise is also set requiring learners to return to the parallel text to re-look at the way specific vocabulary was used in both languages and to reinforce it in writing.

The role of the language buddies

The buddies were used primarily as catalysts to assist the process of using learner-talk to facilitate thinking and to make it possible for learners to do this in home languages (or their own local varieties of language). They also allowed for the kind of social interaction which could promote the extension of what Vygotsky refers to as the zone of proximal development. Thus they were not being deployed as peer teachers in the usual sense but more as facilitators of thinking and the business of processing information and extending their understanding.

The role of the reading assistants

Two language teachers employed by the HLP acted as reading assistants in the classroom from the outset. In rural or township schools learners are supposed to be taught to read in their own home languages during their first three years, but this was not the case in this school. The plan was that the assistants would help learners transfer their existing English-reading skills to home language so as to be able to read the parallel-language text. It was hoped that this skills transfer would only take a few months. But it soon became clear that their English reading was even weaker than anticipated and was so far from age-level competence that at least one assistant would be needed for most of the study period if engagement with text was to be included as an integral part of the approach.

The reading assistants also assessed the home language literacy outcomes set for the lessons, including the translation exercises done for homework. This allowed the class teacher to focus entirely on the numeracy outcomes. They also played a valuable initial role in allaying the teachers' fears of allowing languages which they themselves did not understand to be used in their classrooms. Once it became evident, however, that the approach in fact had the effect of increasing task focus and learner motivation, this need diminished.

The evaluation plan

The original intention was to commission an independent body to evaluate the intervention on three levels: (i) the achievement of its operational objectives; (ii) its effect on mathematical practice displayed in the lessons; and (iii) its effect on learner achievement as reflected by independent test results.

However, when the HLP was unable to raise the necessary funding for this kind of evaluation, it was decided that level (i) objectives would be assessed via internal monitoring, level (ii) effects would be left to an independent academic researcher to assess (as they would be as much an assessment of the efficacy of the HLP's model as of teacher and learner behaviour), and that the GDE's annual "Numeracy Challenge" would provide the independent test results to be compared against the 2005 base.

Unfortunately, despite the original expectations, the GDE encountered problems that led it to abandon the 2006 test. We therefore did not have this indicator of progress at the end of 2006 for either Teacher A's Grade 3 class or for Teacher E's Grade 2 class.

Internal monitoring – Level (i)

In order to provide the necessary feedback for regular action-plan revision, activities were subject to ongoing monitoring via three sources:

1. *The HLP observer.* She sat in on every multi-bilingual lesson, noting the actions of the teacher and learners and the lesson dynamics.
2. *The two class teachers.* They assessed progress against the numeracy outcomes (extracted from the Revised National Curriculum Statement) set for the lesson, starting with a sample of learner work being checked during each lesson at stage 2 and continuing with the checking of learner exercise books showing work done in class and the related numeracy homework from stage 4. The numeracy outcome Learning Outcome (LO) 1.11 (requiring the learners' articulation of own thinking) was sampled during stage 3 of every lesson. The weekly discussions with the HLP observer also required these teachers to be involved in reflecting on their own actions, learner behaviour and lesson dynamics.

3. *The two reading assistants.* They walked around the class during stage 2 listening to and helping with the home language reading and recording their assessments. They also assessed home language writing progress after checking the stage 4 homework translation exercises. Home language literacy progress was reflected on a simple continuous assessment sheet.

From these sources we can conclude that a number of factors limited the implementation of the model, inter alia:

- The amount of time allocated for the study was a limitation from the beginning and this was further reduced in practice. The 60 minute period turned into a 45 minute period because classes often did not start on time and a toilet break had to be given in the middle (a traditional practice in double periods). But the biggest problem was that the agreed programme of 15 lessons for 2005 and 30 lessons per year for the following two years turned into 12, 20 and finally only 16 lessons for 2007. The 2007 teachers' strike alone lost three weeks of teaching time. In 2007, Teacher A was also badly affected by personal problems which caused her to lose more than four more weeks in total. The only provisions made for the chronically high level of teacher absenteeism were a "baby-sitting" duty roster or learners being distributed around other classes to sit in silence in a corner with a colouring book. Other disruptions were caused by sports practices being held during school time for three weeks at the beginning of each year, the showing of visiting plays/educational entertainments, visits from the department of health, teachers being called out of class to see to administrative duties, and intercom announcements during which teachers required learners to stop work and sit mute with their hands on their heads.
- Teachers were so steeped in teacher-centred, passive-learner pedagogy that the learner-centred, active-learner model presented a difficult paradigm shift. To change their view of teaching as a predominantly transmission process was not quickly achieved.
- Engagement with text, an important element in the model, was seriously impeded by the low level of reading proficiency in both English and home language. English levels were considerably

below age standard and the school provided no teaching of home language reading. The reading part of the lesson was thus very slow – although it improved during the course of the intervention primarily as a result of the task-based reading element within the model as in the Prabhu study (Prabhu, 1987).

- Teacher subject knowledge and mathematics-specific pedagogy were both weaker than needed for the task of teaching important foundation numeracy concepts.

Given these obstacles, one can conclude that the full potential of the model was not tested. However, all of these, including the time constraints, could be relatively easily addressed through focused teacher and school management development. Even the learning lost due to the strike could have been at least partially mitigated if learners had been sent home with carefully constructed homework, textbooks and a plan of how to use the community library resourcefully.

Despite the impediments to its implementation, we could conclude by the end of the two-year period that the majority of learners had looked forward enthusiastically to these lessons and that the teachers, despite their misgivings about using an approach that was so different from their normal way of teaching, had made a genuine attempt to implement the model within the limits of their existing level of pedagogical and subject competence. Most importantly, by the end of the study period, they were sufficiently skilled at handling the essential learner-talk and multi-bilingual aspects of the approach to have allowed them to incorporate these into their daily classroom pedagogy.

These conclusions mean that, with the necessary teacher training and management support, the essential features of the model could in fact be applied to everyday teaching and yet still meet the criteria laid down by the school for a practical intervention.

Independent assessment of mathematical practices – Level (ii)

The mathematical practices emerging during the multi-bilingual lessons introduced in the third term for the Grade 3 class of 2005 (taught by Teacher A) were studied by Langa as part of the requirement for her MSc degree. Her conclusions, which are summed up here, are available in her unpublished dissertation (Langa, 2006) and her paper published with Setati in 2007 (Langa & Setati, 2007).

Langa's study included the videotaping of ten lessons and a full transcription and analysis of one of these in terms of Kilpatrick's five strands of mathematical proficiency, viz: procedural fluency, conceptual understanding, adaptive reasoning, strategic competence and productive disposition (Kilpatrick et al., 2001). Her conclusion was that "the use of the home language in this lesson served as an entrance to the first four of these strands" which were in turn essential for the development of the fifth (Langa, 2006: 50)

She describes a vignette from this lesson (Langa, 2006: 46-48) which she maintains demonstrates learners using the kind of conversation, facilitated by the use of the home language, that was good for mathematics (Sfard et al., 1998) in that it was used "to clarify, refine and consolidate their (mathematical) thinking" (Curriculum and Evaluation Standards for School Mathematics quoted in Sfard, 1998: 41).

Langa expressed a concern, however, that this multi-bilingual approach might not be replicable in a regular classroom without the assistance of "the two HLP teachers" (i.e. reading assistants) – "unless learners can already read, write and talk in their home languages" (2006: 56). But she argued that, where learners are being taught in their mother tongue between Grades 1 and 3, as well as being taught their own languages as subjects, which is the case for the majority of learners in South Africa, this should not present a major obstacle. I would argue, on the other hand, that where learners are not being taught to read in their home languages and little effort is being made to give them the chance to learn these languages properly as subjects, it would indeed be an obstacle, and a supportive strategy would need to be employed as was successfully done here.

She was also concerned that the teachers would not be able to produce the necessary parallel-language material independently. In 2007 after the completion of this study, as part of the HLP's broader pilot programme at this school, parallel-language numeracy textbooks were provided for all Foundation Phase learners (more than 500), at a production cost not significantly higher than that for English-only textbooks. Parallel-language readers were also provided for the teaching of multi-bilingual literacy across the whole phase. Books like these remove any need for teachers to have to produce such materials themselves or to have to resolve translation arguments which have

already been dealt with by our National Language Service (equivalent Mathematics and Science terminology in all 11 languages has been available for the first two phases for some time and is currently being finalised for Grades 7 to 12).

Independent test results 2005 and 2007 – Level (iii)

In the 2005 test, the Grade 3 class taught by Teacher A had achieved 14% in the GDE's "Numeracy Challenge". The Grade 3 study class of 2007 taught by Teacher A (that had been taught by Teacher E in 2006), using the multi-bilingual model, achieved the highest score amongst all four Grade 3 classes, viz. 40% compared with the grade average of 29%. Table 3 shows the results for all three grades in 2007 compared with 2005.

Table 3 Results of GDE Numeracy Challenge 2005 and 2007, Sunshine Primary

		2005	2007
Grade 1	Average of all four classes in grade	45%	44%
	Range of four class averages within grade	34–54%	35–52%
Grade 2	Average of all four classes in grade	37%	41%
	Range of four classes	27–44%	29–54%
Grade 3	Average of all four classes in grade	15%	29%
	Range of four classes	13–17%	20–40%
	Teacher A	14%	40%

Overall conclusions

There is evidence from all three levels of evaluation discussed above that the use of a multi-bilingual model made a substantively positive impact on performance in numeracy in our study classes. It is therefore concluded, as postulated in this study, that several languages can be used simultaneously in a multilingual Foundation Phase classroom, alongside an agreed common language, to provide an effective and practical resource for the teaching and learning of numeracy.

The use of the model had the effect of greatly decreasing the amount of time spent on teacher-to-learner oral communication

while giving time to learner verbalisation based on text. The learners' own communicative resources and parallel-language text were the "new" resources being employed, making it possible to use home languages and English together.

Although eight or nine languages were used by the learners, the teacher needed only a single language (English). One of these teachers only had this language as a second language.

While teaching numeracy, this approach was also teaching learners to read for meaning in two languages, how to move between their two languages and, most importantly, how to use verbalisation as a tool for learning. The teaching of these skills should need much less attention in the Intermediate Phase, with the emphasis moving to reinforcement through usage. By the Senior Phase, learner bilingualism should operate as a "transparent" resource (Setati et al., 2008). The teacher's focus throughout should be to enable learners to use a range of mathematical resources to best effect and these include their verbalisation skills in two languages.

This approach needs two ingredients: all teachers to be equipped with the skills to enable learners to use their own languages to assist the learning process, and the support of a core of parallel-language text books (from Grade 1 to Grade 12).

Importantly, these ingredients could also raise current levels of subject performance in monolingual rural schools attempting to use English as a LoLT, while developing both languages side by side. Their application does not need to be limited to schools with a wide range of languages. They also offer communities whose children are currently separated into different schools a way around such social division while improving subject performance and language proficiency.

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