

MATHEMATICS EDUCATION ACROSS TWO LANGUAGE CONTEXTS: A POLITICAL PERSPECTIVE

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There is a continuing debate in mathematics education research and practice regarding the use of languages in multilingual mathematics classrooms in which children are not yet fully fluent in the language of learning and teaching (LoLT). Research in mathematics education supports the use of the students' home languages for teaching and learning (e.g. Adler, 2001; Khisty, 1995; Moschkovich, 1999, 2002; Setati, Molefe, & Langa, 2008). The use of the students' home languages has been argued as a support needed while students continue to develop proficiency in the LoLT at the same time as learning mathematics. However, there is not much take-up on the ground. The question is why?

During a conversation that took place between two Latin American students that were working in the same small group in a mathematics classroom in Barcelona, one of the students insisted to the other, in Spanish, "*You'd better say it in Catalan.*" The second student responded, "*You listen to the mathematics.*" In our view, this exchange illustrates the complex relationship between language choice, participation, and mathematical learning in multilingual classrooms. Why would two students who share a first language argue about the use of a second language in a mathematical interaction? These kinds of conversations are not unique to students in Barcelona. Below are two extracts from Setati (2008) in which a teacher and a student, in data collected in South Africa, express similar views.

If we changed our [mathematics] textbooks into Setswana¹ and set our exams in Setswana, then my school will be empty because our parents now believe in English. (Lindi, a Grade 4 mathematics teacher)

English is an international language, just imagine a class doing maths with Setswana for example, I don't think it's good. (Tumelo, a Grade 11 mathematics student)

The introductory discussion above captures the essence and complexity of the debate regarding the use of languages in multilingual mathematics classrooms in which children are not yet fully fluent in the LoLT. In our view, the debate is not just about language and/or mathematics; it is also about social relations, the political role of language, and the context in which the mathematics is taught and

learned. It is important to ask what political issues are at play in these interactions and how different they are for different political and multilingual contexts.

In this chapter, we draw on our individual journeys in this area of study to explore some political aspects of mathematics education and language diversity across two contrasting political and multilingual contexts. Through these narratives we provide a window into the political tensions and questions that illustrate the complexity of this work and illuminate/illustrate some of the research findings that seem to hold across our differing multilingual contexts. To put this debate in perspective we begin with a brief overview on the political role and use of language. We then comment on concrete data from students and teachers in our two research contexts, Catalonia and South Africa, and move to a more general discussion on issues of language, race, class, and power.

LANGUAGE, POWER, AND MATHEMATICS TEACHING AND LEARNING

An important connection exists between the languages of learning and teaching and the knowledge that is produced in the schools. Nevertheless, in our work the emphasis is on social access to school mathematics (Planas & Setati, 2009), and not just the mathematical knowledge that is produced through epistemological access. We argue that an important connection also exists between the LoLT and the nature and extent of the students' participation. Participation is highly influenced by questions related to the politics of language and the political roles of languages which include, among others, issues concerning who decides what language should be used for learning and teaching, what informs this decision, as well as whose participation in the classroom is supported or constrained as a result of the chosen LoLT.

The political role of language

Language, like multilingualism, is always political (Gee, 1999). It is a characteristic that is used in society to determine power (Gutiérrez, 2002). All over the world the issue of language has always been interwoven with the politics of domination and separation, resistance and affirmation. During apartheid in South Africa, the language of learning issue became a dominating factor in opposition to the system of Bantu Education.

The Bantu Education Act of 1953 stipulated that "mother tongue instruction" be phased in across all primary school grades in African primary schools, with English and Afrikaans as compulsory subjects from the first year of schooling. English and Afrikaans were the only two official languages, the latter having developed out of Dutch settlement. None of the African languages was recognised. In addition, both English and Afrikaans were also to be used as languages of learning and teaching on a 50/50 basis when transfer from main language learning took place in the first year of secondary school (Hartshorne, 1987, p. 70). The educational interests of the pupils became subordinate to ideological and political factors. The government's greatest concern at the time was that the constitution of South Africa required equality in treatment of the two official languages. These policies were centred on fears that the Afrikaans language, culture, and tradition might be overwhelmed by

the older, more internationally established, English language, culture, and tradition (Reagan & Ntshoe, 1992, p. 249).

Though not unmindful or ashamed of African traditions per se, the mainstream African nationalists have viewed cultural assimilation as a means by which Africans could be released from a subordinate position in a common, unified society (Reagan & Ntshoe, 1987). They therefore fought against the use of African languages as languages of learning and teaching because they saw it as a device to ensure that Africans remain oppressed. Many analysts trace the 1976 uprising, which began in Soweto and spread all over South Africa, to belated attempts by the Nationalist government to enforce the controversial and highly contested 50/50 language policy for African learners. African teachers were given five years to become competent in Afrikaans.

In 1979, in the wake of the 1976 revolt, the government introduced a new language policy. This new policy emphasised initial main language learning with an eventual shift in LoLT to English or Afrikaans. As a general rule, the African child began his or her schooling in the main language, which remained the LoLT through the fourth year of schooling (Grade 4). During these first four years both English and Afrikaans were studied as subjects. Beginning in the fifth year of schooling (Grade 5) there was a shift in LoLT to either English or Afrikaans, which were by then the official languages of the country. This is the system under which Mamokgethi, who is fluent in nine languages, including English and her home language, Setswana, went to school. In her writings she describes her educational experience as follows:

I learned mathematics in Setswana at primary school up to Grade 4. The switch to English as language of learning and teaching (LoLT) happened in Grade 5. Even though I passed my mathematics Grade 12 examinations in English I was not fluent in it. I proceeded to university where I took mathematics (in English) as my first major and passed it with a good grade in my final year. Reflecting back on my own learning of mathematics in English the greatest difficulty was learning in a language in which I was not fluent. As I look back, I am aware that much of my learning was based on memorisation, a function, in my view, of my limited fluency in English. (Setati, 2002a, p. 1)

As she explains, her fluency in English improved markedly during her postgraduate studies. As many South Africans who were in primary school in the eighties and nineties could testify, Mamokgethi's story is not unique. The new era for South Africa began in 1990 with the unbanning of liberation movements and the release of Nelson Mandela.

In 1997, three years after liberation, South Africa introduced a new language-in-education policy (LiEP) that recognises 11 official languages. According to this policy, not only can South African schools and students now choose their preferred LoLT, but there is a policy environment supportive of the use of languages other than one favoured LoLT in school, and so, too, of multilingual language practices like code-switching. While this new LiEP is widely acknowledged as "good", it is

meeting significant on-the-ground constraints. Several South African researchers have argued that while this policy is intended to address the undervaluing of African languages, in practice English, the language of former colonisers, still dominates (Setati, 2002b; Setati & Adler, 2000; Setati, Adler, Reed, & Bapoo, 2002). Research shows that most schools are not opting to use students' home languages as LoLT, in both policy and practice (Taylor & Vinjevold, 1999, p. 216). This situation is not unexpected – home language as LoLT policy or “mother tongue instruction” has a bad image among speakers of African languages. It is associated with Apartheid and hence inferior education.

While the new language policy in South Africa is intended to address the overvaluing of English and Afrikaans and the undervaluing of African languages, various institutional arrangements and government policies have resulted in the dominance of English in the linguistic market. First, there has been the policy of English and Afrikaans-medium higher-education policy in South Africa for many years. The LoLT in most of the universities in South Africa is English and it seems that this policy will continue for many more years since it has not yet been challenged in higher education circles. Second, there is an English/Afrikaans language pre-requisite for anyone aspiring to become a professional in South Africa. Students need to pass a school-leaving examination in English as a first or second language, in addition to mathematics, to enter and succeed in the English-medium higher education and training programs. Third, there have been policies upholding English and Afrikaans as official, legal, and government languages. The nine African languages spoken by the majority of South Africans did not enjoy any official status until 1994. However, these languages are still in many ways secondary to English in reality; for example, most of the policy documents are written in English only. Fourth, there has been the imposition of an English/Afrikaans-language requirement for individuals aspiring to join the civil service. This is mainly because English and Afrikaans were the languages used before liberation in 1994. For instance, while Afrikaans has lost popularity, the ability to communicate in English or Afrikaans is one of the requirements for anyone willing to train as a policeman or policewoman. The fact remains that English is the most important criterion for selection for high-ranking officials, and knowledge of an African language is seen as an additional asset, but not an essential one. With these institutions and policies well entrenched in the various administrative, educational, and professional arenas of South Africa, a symbolic market has been formed where English constitutes the dominant, if not exclusive, symbolic resource. It is a prerequisite for individuals aspiring to gain a share of the socio-economic, material resources enjoyed by an elite group.

In Catalonia, an autonomous region in North-Eastern Spain, Catalan and Spanish are used as markers of social class and nativeness (Mar-Molinero, 2000). Catalan was a forbidden language during Franco's dictatorship. This same language is now being politically affirmed as a consequence of processes of Catalan nation-building that focus on the differences between Catalonia and Spain. The choice of Catalan as the LoLT was organized after 1983 as a controversial way to integrate a large portion of the population that had arrived from other parts of

Spain in successive immigration waves (Strubell, 2006). In the school system the tensions between the two official languages in the country have mostly been represented by the symbolic distance between the Catalan “native” people and those Catalans whose parents are Spanish and were born outside Catalonia. The arrival of people from Latin America in the nineties has introduced new power relations, as their accents are socially considered as being of a lower status in comparison to those of the Spanish speakers regarded as nearer to the so called standard Catalan language and culture.

The current situation in the Catalonian context is totally different in comparison to South Africa and what Mamokgethi experienced in her primary school. In the seventies, the only official language in all parts of Spain was Spanish, although during later stages of the Franco regime, certain uses of Catalan were “tolerated”. Núria’s home language is Catalan. She grew up being told at school that her language was a “variety” of Spanish and French, mostly spoken by working-class groups and peasants of villages from North-Eastern Spain. In the nineties, before getting her university position and having finished her studies in mathematics, Núria became a secondary school mathematics teacher in Barcelona. The long tradition of monolingual policies in Spain had already been changed by making the use of Catalan obligatory in many public domains, and by institutionally recognizing the importance of the Catalan academic grammar and literature. The reconsideration of status for the Catalan language was forced by the solid organization of Catalan nationalism in reaction to forty years of the Franco regime. The fact also helped that Catalan became the national and the only official language of Andorra, a small prosperous country in South-Western Europe. Since then, the issue of whether Catalan is a language or a dialect, closely related to the discussion of Catalonia being a nation or a region, has been the subject of political agitation several times. On July 10, 2010, for instance, more than a million people marched in Barcelona in support of the Catalan language and protesting a verdict by the Spanish Supreme Court imposing the co-officiality of Catalan and Spanish in the school system, and explicitly talking about the need to preserve the unity of Spain. Although the court was clear about its verdict, more than one year later Catalan still remains as the LoLT as a consequence of complex and strategic political alliances.

As described for our two cases, South Africa and Catalonia, the political nature of language is not only at the macro-level of structures but also at the micro-level of classroom interactions. Language can be used to exclude or include people in conversations and decision-making processes. Zentella (1997), through her work with Puerto Rican children in El Barrio, New York, shows how language can bring people together or separate them. Language is one way in which one can define one’s adherence to group values. Therefore, decisions about which language to use in multilingual mathematics classrooms, how, and for what purposes, are not only pedagogic but also political (Setati, 2005). While research in general education on language and minority students is strongly rooted in the socio-political context of learning (Cummins, 2000), most research on mathematics education and language diversity has been framed by a limited conception of language as a tool for

thinking and communication. As Setati (2005) argued, to ignore the political role of language in mathematics education research and practice would assume that power relationships do not exist in society.

The political use of language

The historical exclusion of speakers of minority languages in mainstream schools and classroom practices has been extensively documented (Barwell, 2005, 2009; Cummins, 2000; Gutstein, 2006; Khisty, 1995; Planas & Civil, 2010a). In particular, the language policies and ideologies in Catalonia and South Africa mark in concrete ways the use of languages in mathematics classrooms and the broader school context.

In Catalonia, for instance, the terms “Catalan students”, in opposition to “non-Catalan students”, are common expressions that tend to be accepted as neutral. However, the term “non-Catalan” is applied to students who do not have Catalan as their first language, although they may have been born in Catalonia and they may not be children of immigrant families. This fact indicates exclusion based on language issues. Moreover, different official documents refer to students who are not predominantly Catalan speakers as “students with low language proficiency”, which suggests a deficiency on the part of students without clarifying that this proficiency is considered in relation to Catalan. Hence, exclusion is orchestrated through a use of language that points to what some groups do not “have”. These, and other common expressions in the Catalonian context, make language minorities live as a “perpetual underclass” based on language, a situation that predominantly Catalan-speaking students and teachers have never experienced.

Since “Catalan native speakers” are unlikely to disadvantage themselves for reasons of language, one should ask what is hidden behind classroom practices and why the words themselves (e.g., “Catalan students”, “native speakers”) become the issue. In Planas (in press), the analysis of interactions in a mathematics secondary classroom indicates different practices of exclusion based on language. Gutstein (2003, 2006) and Khisty (2006) have also documented practices of exclusion based on language in the United States with Latino and Chicano students in their learning of mathematics. Setati’s work (e.g. 2005, 2008) on exclusion based on language use is particularly illuminating due to the multilingual complexity of South Africa.

Setati (2008) argues that, given the dominance of English, the choice that the South African LiEP offers is a chimera. In her view, the assumption embedded in this policy is that mathematics teachers and students in multilingual classrooms, together with their parents, are somehow free of economic, political, and ideological constraints and pressures when they apparently freely opt for English as LoLT. The LiEP seems to be taking a structuralist and positivist view of language, one that suggests that all languages can be free of cultural and political influences.

In this chapter, the hegemony of English is mainly related to the discussion of the South African context, while the hegemony of Catalan is related to the discussion of the Catalonian context. Nevertheless, in Catalonia the number of

mathematics classrooms with Content and Language Integrated Learning (CLIL) methodologies, with English as the LoLT, is an increasing phenomenon. Although the official positioning is that CLIL methodologies seek to support multilingualism and additional language(s) learning, in practice the political tensions between Catalan and Spanish point to the progressive promotion of fluent Catalan and English bilinguals as a way to reduce the representation of the Spanish language. We argue that the idea of a hypothetical and future balanced situation between Catalan and English is also a chimera. Phillipson's (1992) theory of English language imperialism, and his more recent discussion on the well-organized attempts to establish the hegemony of English in Europe (Phillipson, 2003), indicate that the value of any sort of multilingualism is code for appreciation of the importance of English. We need to wait for at least one decade to examine how the language and political situation in Catalonia evolves. On one hand, the verdict by the Spanish Supreme Court in 2010 and, on the other, the local initiatives to progressively substitute Spanish by English through CLIL methodologies, suggest significant changes.

ANALYSING EMPIRICAL DATA TO UNDERSTAND THE PROBLEM

In our two contexts of research we work with classroom data, teachers and students to examine the political use of language in mathematics teaching and learning. In this section, we put together data from the teachers and the students' perspectives in South Africa and Catalonia with the aim of identifying practical orientations to common challenges. There are other significant works in mathematics education and language diversity that also draw on the idea of searching for differences and commonalities across contexts (see, for instance, Setati & Moschkovich, 2010; Planas & Civil, 2010b; Setati & Barwell, 2006). This is a very useful approach because, when researchers work only within their countries, the context can be taken for granted to some extent and important elements can be unintentionally dismissed.

Teachers' perspectives

In each of our studies we have explored the perspectives of teachers in multilingual mathematics classrooms through semi-structured interviews and conversations. In Catalonia, these are teachers from secondary schools, while in South Africa they were selected from primary schools. Our analysis of part of the knowledge gained from these interactions is presented below.

What can be seen is that, while different preferences are differently argued, teachers have a clear preference for one language. From a poststructuralist perspective (Gutiérrez, 2010), students and teachers are not "agentive" on their own; rather the social and political structures in which they participate impose constraints on, and enable their agency. In particular, the teachers' perspectives are influenced by these structures. These structures may explain shared discourses on "choosing the right language of teaching", which in turn convey

an ideological position against other languages that are thought of as “not appropriate” for instruction. The interpretation of these discourses on language is, however, problematic. On one hand, it can be said that exclusion appears by the fact of reproducing the language status quo. But, on the other hand, it also can be argued that inclusion is sought through the efforts toward “democratising” the language privileges that the dominant groups have enjoyed for a long time.

Perspectives of teachers in South Africa Teachers were asked the following question in English during individual interviews: “Which language do you prefer to teach mathematics in? Why?” Over and above all else, “English is international” emerged as a dominant discourse that shaped the teachers’ language choices. All the six teachers interviewed stated ideological and pragmatic reasons for their preference to teach mathematics in English. Like many teachers in South Africa, they are aware of the linguistic capital of English and the symbolic power it bestows on those who can communicate in it. One of the teachers for example said: “I prefer to teach in English because it is a universal language.” All of the teachers used similar language referring to English as an international or universal language. Awarding such a status to English suggests that they have accepted the dominance and power of English. They do not have any control over the international nature of English. All they can do is to prepare their students for participation in the international world, and teaching mathematics in English is an important part of this preparation. One of the teachers expressed the reasons for her preference for English as follows: “It is an international language... The textbooks are written in English, the question papers are in English...”. Another one argued that: “If they [the students] do not learn the language how will they be able to cope in higher classes?” All of the reasons that the teachers gave for their preference for English were unrelated to mathematics learning but, rather, were about the need to ensure that students can gain access to social goods that fluency in English makes available.

The analysis presented above highlights the teachers’ preference for English as the LoLT. A glaring absence in the teachers’ discourses is any reference to how learning and teaching in English, as they prefer, would promote their students’ access to mathematics knowledge and success. The teachers interviewed regarded teaching mathematics in English in these multilingual classrooms as another opportunity for students to gain fluency in English. Explanations for preferred language(s) for mathematics teaching focussed on English and not mathematics. These teachers positioned themselves in relation to English (and so socio-economic access) and not mathematics (and so epistemological access).

Perspectives of teachers in Catalonia The perception that languages spoken by immigrant students are directly connected with underachievement in school mathematics appears in many teachers’ discourses. When asked about how the teaching of mathematics can be improved in multilingual classrooms, teachers first suggested increasing the teaching of the LoLT, that is, to have a stronger focus on

the learning of Catalan. This is expressed with sentences like: “When they [immigrant students in mainstream Catalonian schools] speak Catalan, their problems will be solved.” Other teachers put the emphasis on the students’ transition processes by pointing to discourses on “normality” and “difference”: “They are good at learning the way things are here quickly.”

Below is part of the conversation in one of the meetings with the teachers of the Critical Mathematics Education Group (for more details on this group see Planas & Civil, 2009). Since 2005, Núria has been co-ordinating this group of secondary mathematics teachers with experience in multilingual classrooms. In one of the sessions, two of the Catalan teachers, Cesca and Anna, talked about the idea of having only one language that “helps”, and that language being Catalan.

- Núria: What could you tell other teachers from your experience in multilingual mathematics classrooms? You said it’s hard but it’s worth it...
- Cesca: My experience tells me that Catalan helps with the mathematics. I’d like very much knowing their languages but I’m not good at that. And I really could not lead a mathematical discussion with so many languages all together. Catalan helps, though they can summarize the main ideas to each other by using Spanish, Arabic, or whatever.
- Anna: Yes, Catalan... it really helps.
- Núria: In your case, Anna, most students are Latin American, right?
- Anna: Yes. It’s not clear why it’s difficult for them to speak Catalan. Maybe because we also make efforts to speak a sort of mixed language that is neither Catalan nor Spanish. I talk to them in Catalan because I want them to know the language of the place they are living in. How long would you expect their learning to be if we, the teachers, use Spanish?

These teachers and others in the group referred to achievement and underachievement questions in terms of advances in the learning of Catalan. The challenge was identified as being the fact that some students are dominant in their home languages while they learn mathematics in an additional language (Catalan), which they are still learning. As shown in the extract above, the students’ home languages were not valued by the teachers, who could not imagine a mathematical discussion with “so many languages all together.” Somehow this means that the teachers did not recognise the power of thinking mathematically in a language different to Catalan, except during the time devoted to small group work.

The teachers’ focus on the social dimension of “access” When examining the teachers’ perspectives a shared finding has to do with the teachers putting the emphasis on the importance of gaining fluency in the LoLT (English in South Africa and Catalan in Catalonia). Despite the fact of being teachers of mathematics and responding to questions during the interviews in which the mathematics was made explicit, the teachers argued in favour of using either English or Catalan to ensure access to social goods, and rarely referred to issues concerning epistemological access. In Barcelona, Cesca talked about “Catalan helping with the

mathematics” but she did not explain why it should be easier to learn “fractions” or “isometries” in Catalan in the cases in which this is not the students’ home language. This differs from Anna’s argument when saying, “I want them [the Latin American students] to know the language of the place they are living in.” In the interviews with the South African teachers, a similar positioning is expressed by exemplifying concrete social goods such as “coping in higher classes” where English is the LoLT.

Gaining epistemological access in a multilingual mathematics classroom includes how the mathematics curriculum is mediated as well as the teaching and language practices used. The fact that these mathematics teachers considered “access” only from a social perspective and with very weak connections to the mathematics and the curriculum is itself problematic. For instance, one of the South African teachers says that the textbooks and the question papers are written in English, but she does not reflect on the textbooks and question papers themselves. In this way, she positions herself as a helpless teacher who just implements what is prescribed rather than one who can shape what should be prescribed. A productive discourse would be one that, instead, engages with the possibilities of adapting the use of an English mathematics textbook with students who are still developing fluency in English. We argue that by showing a strong awareness of the social dimension of “access”, the teachers in our studies have a “sensitivity” that is absolutely necessary. Nevertheless, at the same time they lose the opportunity to stress the complementary epistemological dimension of “access” and do not go into a more practical curricular discussion.

Together with the tension between gaining access to mathematics and gaining access to social goods, other dialectical tensions are represented by discourses of the teachers in the two settings. The dilemma between participation in the “normalized” international world and participation in the “diverse” local communities is real for many multilinguals. Most teachers position themselves in clear ways when arguing in favour of English as the international language and Catalan as the “normalized” LoLT in classrooms with students whose home languages are not, respectively, English or Catalan. Nevertheless, the adoption of these practices does not imply a disregard for practices that strive to retain the students’ “minority” worldviews. Many teachers do not consider these sets of practices as incompatible. Vithal and Skovsmose (1997) indicate the invisibility of this particular tension between the promotion of dominant and minority worldviews.

Cultural approaches to education in multicultural societies often assume that cultures are compatible and in harmony within themselves and with each other. In so doing they render invisible any conflicts that can and do exist and hence preclude the development of strategies for coping with them. The consequence is that teachers who employ cultural approaches appear not to notice conflicts which do exist or in the face of conflicts simply stop using such approaches. (Vithal & Skovsmose, 1997, p. 146)

Teachers may acknowledge the linguistic, cultural, and social capital of their students (e.g. “They are good at learning the way things are here”); and at the same time, they may perceive complications for the students’ academic and social promotion linked to certain school practices (e.g., “How long would you expect their learning to be if we, the teachers, use Spanish?”).

Students’ perspectives

In our view, the voices of marginalised students are not adequately represented in mathematics education research, hence we consider students’ perspectives. The work of authorizing students’ perspectives is essential in our research because it helps introduce the voices of those who daily experience the effects of existing educational policies-in-practice. We want to help address and redress the fact that students tend to be silenced in the comprehension of the school context, and in the analysis of what elements of schooling need to be changed.

In our analysis below, what can be seen is that students have a clear preference for one language, as we have documented with the teachers in our two contexts of research. Again the social and political structures ground official discourses that favour the students’ “enthusiasm” for learning in a language that is not their own, even in the cases of students who have difficulties understanding the LoLT, and this reality gives them a hard time. Accordingly, language diversity is not considered as an appropriate reality for the school context, and in particular for the mathematics classroom. These students’ ideal picture of language use in their school is precisely what they are experiencing with having only one LoLT.

Perspectives of students in South Africa All of the interviewed students are multilingual as they have fluency in at least four languages. They were all at Grade 11 level and studying mathematics in English, which is not their home language. During the individual interviews, students were asked the following questions in English, “Which language or languages do you prefer to be taught mathematics in? Why?” Students were also given an opportunity to choose their preferred language for the interview. All of the students chose to be interviewed in either their home language or a mixture of English and their home language.

While there were conflicting discourses in the students’ views, what was clear was that the majority of students expressed their preference to be taught mathematics in English. For these students, learning mathematics in English is not so much about choice; it is just how things should be. Examples of how the students expressed this sentiment are, “English is an international language; just imagine a class doing maths in Setswana” and “It is the way it is supposed to be because English is the standardized and international language.” For these students it is unimaginable for mathematics to be taught in any other language. The use of English as a LoLT for mathematics is common sense to them; they simply cannot imagine mathematics without English. Among the reasons why they want to be taught in English is the fact that mathematics textbooks and examinations are in English, university lectures and job interviews are only in English, and

communication with “white people” is in English. All this contributed to the discourse that without fluency in English a student would not have access to social goods such as higher education and employment, which suggests that, like teachers, these students saw mathematics learning as another opportunity for improving their fluency in English. This was the case even for the two students who indicated that for them it does not really matter what language is used for teaching and learning because mathematics is a language on its own. Below is an extract from the interview with one of the two students, whose home language is isiZulu.

Mamokgethi: So if you had a group of students who want to do maths in isiZulu, what would you say to them?

Lehlohonolo: That’s their own problem because if they get out of high school, they cannot expect to find an Indian lecturer teaching mathematics in isiZulu. English is the simplest language that everyone can speak so they will have to get used to English whilst they are still here.

Throughout the interview, Lehlohonolo never connected success in mathematics or lack of it to fluency in English. However, in the above extract he argues for the importance of gaining fluency in English before completing high school. The sentiment that English is bigger than us and thus cannot be avoided or ignored because in higher education no lecturer will be able to teach mathematics in the students’ home languages is evident in Lehlohonolo’s discourse. He even draws in the issue of race by referring to a hypothetical Indian mathematics lecturer. Hidden in what Lehlohonolo is saying above is a suggestion that there are no isiZulu speaking mathematics lecturers at university. This indicates the strong connection between the politics of language and race and mathematics teaching and learning.

Despite the overwhelming discourse that foregrounds the hegemony of English and the need to gain access to social goods that English makes possible, there are differences in the manner in which different students positioned themselves. The students who explicitly indicated that it does not really matter what language mathematics is taught in positioned themselves in relation to mathematics. Their language preferences were connected to gaining proficiency in mathematics rather than gaining fluency in English. The rest of the students positioned themselves in relation to English in the sense that they were more concerned with gaining fluency in English so that they can access employment and higher education. Their desire to gain fluency in English was not connected in any way, at least explicitly, to improving their mathematics learning but to access to social goods. As a result, they saw mathematics teaching and learning in multilingual classrooms as an opportunity to gain fluency in English.

Perspectives of students in Catalonia In Catalonia, there are important similarities in the students’ answers concerning their “preferred” language while learning mathematics in the class. In individual interviews with ten Latin American immigrant students in mainstream Catalonian schools, the students themselves do not seem to expect to learn mathematics through their home language.

They express their concern that using Spanish “too much” could have negative effects on their mathematical achievement by stating, for example: “I speak Spanish with my peers in the small group work but try to speak Catalan the rest of the time, to go on with the mathematics.” The conversation below with Julio, a student aged 12 from Venezuela, indicates how he sees his home language, Spanish, as a weak resource in the teaching and learning of mathematics in Barcelona. At the time of the interview, he was still in the parallel system of special classes² with other late arrival immigrant students who had been classified like him as not having a sufficient knowledge of the LoLT.

- Núria: Why don’t you like the idea of getting into the regular classes?
- Julio: It’s not that I don’t like it, but that I’m fine here.
- Núria: You mean in the special class, do you?
- Julio: Yes.
- Núria: Why?
- Julio: I’m learning Catalan.
- Núria: And what about the mathematics?
- Julio: That comes later.
- Núria: When?
- Julio: When I need fewer efforts with the understanding.
- Núria: The understanding of Catalan?
- Julio: Yes.
- Núria: But now we are speaking Catalan and you do it great.
- Julio: I can do it even better.

A conversation with Julio’s father also reinforced this idea of Catalan being the “right” and “preferred” LoLT. Julio’s father indicated that he does not want his children to be taught through their first language because it was not the language that was going to help them if living in Catalonia. This is consistent with what Julio and other Latin American students said about “wanting the opportunity” to learn basic Catalan as quickly as possible in the parallel system of special classes for late arrival immigrant students, and mathematics classes helping them to improve their knowledge of Catalan. The issue of focusing on the “right” to be exposed to the LoLT shows that these students are positioning themselves in relation to Catalan and not mathematics. As in the interviews with the teachers in the Catalanian context, these students did not connect the use of home languages with the learning of mathematics.

The students’ choice to learn mathematics in English/Catalan Like the teachers, the students in our work put the emphasis on the language rather than on the mathematics. They also refer to the social dimension of “access” and more explicitly to the idea of having the right to choose the language for their learning of mathematics. They enact this belief in the power of English by indicating preference for English or Catalan as LoLT. This view is clearly represented by Julio, who tries to exclude himself from the system of regular classes in which students have more lessons of mathematics per week, because “he can do it even

better” with the Catalan. In neither Catalonia nor South Africa have the students expressed a concern with the possibility of losing mathematics learning opportunities as a result of their limited fluency in the LoLT. For them, what is important is utilising their primary and secondary school years to gain fluency in Catalan/English.

As indicated earlier, most of these students do not directly connect success, or lack of it, in mathematics to fluency in Catalan/English. They actually position the learning of mathematics as secondary to gaining fluency in Catalan/English. It is not that they do not value the importance of mathematics in their schooling and the role of this subject in opening up their opportunities for social and academic promotion. However, they interpret the learning of Catalan/English as more important in their respective “perceived” school, social, and political contexts. Lehlohonolo says, “English is the simplest language that everyone can speak”; therefore it makes sense to argue for the right to learn in this language and not in isiZulu, for instance. They do not seem to appreciate the fact that the complex relationship between language proficiency and mathematical achievement still remains even after having acquired a good knowledge of the LoLT. In our view, while successful learning of mathematics is enabled in contexts where the students are fluent in the LoLT, we agree with Setati, Chitera, and Essien (2009) that student performance (and by implication, mathematical achievement) is determined by a complex set of interrelated factors.

Poor performance by multilingual learners thus cannot be solely attributed to the learners’ limited proficiency in English (suggesting that fluency in English will solve all problems) in isolation from the pedagogic issues specific to mathematics as well as the wider social, cultural and political factors that infuse schooling. (Setati et al., 2009, p. 73)

In general, what we have learned during the interviews with teachers and students is that within school mathematics teaching and learning there is no recognition of the political role of language and how it plays itself out in multilingual classrooms. There is a need to raise the level of these students’ “empowerment” so that they ask for the same right to access to mathematics.

GENERAL DISCUSSION

So far, through our interpretation of the cases of Catalonia and South Africa, we have highlighted the complex relationship between language choice, participation, and mathematical learning in multilingual classrooms. We have paid special attention to the political dimension of this relationship. To understand the problem of unequal learning opportunities, we claim the need to explore different “marks³” that make it difficult for certain groups of students to participate in the mathematics classroom. We have focused on groups of language minority students in mainstream classes who do not have the LoLT as a “native” or home language. For these groups, we assume that things such as language choice, language accents, and language ideologies are at the origin of social marks and academic behaviours that

have a strong influence on the students' achievement. We have examined political "common sense" realities in which languages other than English or Catalan are associated with lack of opportunities and discourses of difference.

Most of the students and teachers in our work in Catalonia and South Africa attach high value to being fluent in the language of power. Moreover, all of these students and teachers are multilingual, which means that they are able to communicate in both their home languages (e.g. Spanish, Setswana, isiZulu) and in Catalan/English. In the case of the students, the fact that their home languages are not their "preferred" languages of learning and teaching speaks of a "pragmatic" choice, and provides insight into the relative value that they attach to their home languages in general. There is therefore evidence of different valorisations of different languages.

Our data, however, tell a more complex story than the issue of "choice" itself. It is a story of languages that are not supported enough within the society, and of other languages that are marked with the ideals of social promotion and academic success. We have the status of English in South Africa as an international language, and that of Catalan as the language of the "native" middle social class in Catalonia. Hence it is not only a question of having different languages, but overall a question of these languages and their speakers having different valorisations and voices. The problematic issue is not the language per se, but the values given to the language and those who speak it. The extent to which students will be enabled to participate in the mathematics classroom has to do with the knowledge and acceptance of certain values attached to the official LoLT.

Discourses on the "inappropriateness" of minority languages in the school context provide arguments for the imperative to learn "standard" Catalan/English. In Catalonia this has led to two parallel systems of classes, one with an intensive Catalan as a Second Language program in the so-called "special classes" to facilitate fluency in Catalan as quickly as possible. The role given to language in the LiEP and in the students and teachers' perceptions, however, contrasts with the creative use of language diversity in some of the mathematics classrooms from our case studies in Catalonia and South Africa. While teachers may be in favour of monolingual settings, these settings are not easy to translate into practice. In our view, this is due to the challenges that are imposed on classroom settings where students learn mathematics in a language that is not their own.

In Catalonia, despite the absence of language guidelines for (mathematics) classroom practices, and the segregation in "special classes" for late arrival immigrant students who do not speak (sufficient) Catalan, some teachers express a need for understanding how practices of code switching would help the teaching and learning of mathematics. There is a pedagogic debate started on how a "controlled" incorporation of the students' home languages could be achieved. Hence an increasing tension appears between discourses on monolingualism in institutional contexts and more flexible and sometimes hidden discourses on language diversity in practice contexts. These tensions are also expressed through the experiences of teachers, who sustained in the interviews the monolingualism power discourse and at the same time promote situations of home language use in

their teaching by drawing on practices such as code switching (see Planas, Iranzo, & Setati, 2009).

The situation in South Africa is different from Catalonia since there is a formal policy that prescribes eleven official languages and encourages multilingualism. The challenge, however, is in the valuing of these languages. While the South African language policy in South Africa is intended to address the undervaluing of African languages, in practice English continues to dominate. Although it is the main language of a minority, English remains both the language of power and the language of educational and socio-economic advancement; that is, it is a dominant symbolic resource in the linguistic market (Bourdieu, 1991, 1998) in South Africa.

Cultural and linguistic unification is accompanied by the imposition of the dominant language and culture as legitimate and by the rejection of all other languages into indignity. (Bourdieu, 1998, p. 46)

The linguistic market is embodied by and enacted in the many key situations (e.g. educational settings, job situations) in which symbolic resources, like certain types of linguistic skills, are demanded of social actors if they want to gain access to valuable social, educational, and eventually material resources. It is now more than ten years since this language policy was instituted and English remains the language of politics, media, commerce, and higher education. It is not surprising, therefore that South African teachers and students think it unimaginable that mathematics can be taught in any other language than English. While the political landscape is now different and the language policy has changed, what remains is the hegemony of English, which is fuelled by the desire of the formerly oppressed masses to gain access to a language that they were denied access to, as well as the social goods that accompany it. It is this symbolic power of English that makes families, teachers, and students want to strive for proficiency in English, even when it is at the expense of what Morrow (1994) refers to as epistemological access, namely access to mathematical knowledge and information. Analysis of data from South Africa shows that the quest for access to social goods predominates over that for epistemological access. This makes the progressive LiEP and research hard to translate into practice in South African classrooms.

FUTURE RESEARCH

In our studies we work with students who not only learn mathematics in a language that is not their home language but who also come from low socio-economic backgrounds and are of a different race – for example, in South Africa it is black South African township students and in Catalonia it is what we refer to as non-European Union students in urban suburbs. In our work together we have come to agree that we both use language as a proxy for race and socio-economic class (see also Setati & Moschkovich, 2010). Nevertheless, our work does not directly address issues of how race and socio-economic class impact mathematics education in multilingual contexts. This is an important matter for future research to consider. Our own position is that race and class are highly interconnected with

issues of language, but the connection is much more complex than is sometimes assumed (see Lubienski, 2001, for a discussion on the isolated examination of race, class and gender in the field of mathematics education research and some of the implications of this tradition in the analysis of students' mathematics achievement in the United States).

Rather than viewing race and class as fixed categories that determine the use and learning of the language of instruction among particular racial and socioeconomic groups, poststructuralist theories (see the work by Gutiérrez, 2010) explore how race and class are shifting categories that get constructed by discourses. The big issue then is how people with certain racial and socioeconomic status get positioned or position themselves in relation to mathematics and the language used for learning and teaching it. For non-European Union students in the area of Barcelona, who come from Bolivia for instance, race may be somewhat fixed – especially if these students have “indigenous” features – but the construction of a racial identity is variable and part of a complex process of socialization with implications for the possibilities of learning. This poststructuralist approach avoids reinforcing the classical dichotomy between middle-class and working class, or white people and those of African descent, to move towards a more sophisticated knowledge of how and why certain groups learn mathematics in a classroom with a language that is not their own.

In our view, race and socioeconomic class need to be unpacked according to diverse power relationships. All language, race, and class discourses are socially related to discourses on “difference” that have partially substituted previous discourses on “deficit”. One of the questions is whether these discourses on difference have been also incorporated in the research without explicitly clarifying the political dimension that the notion of difference has. By not paying enough attention to power, researchers can easily refer to language, race, and class as if they were unique conditions for specific groups. Quite often, social class is only mentioned in research in which the students are thought of as working-class and race is only mentioned when the students are, for example, of African descent. It is similar to what happens with studies on gender, in which the notion of gender has practically become synonymous with “groups of girls”. Discourses on difference do not necessarily need to have reductionist consequences in research; in fact, they can help put the emphasis on the socio-political construction of differences for the purpose of either reproducing or opposing power relationships. The problem, however, is that the emphasis on difference turns into a way of only marking concrete differences.

Further research in multilingual mathematics classrooms needs to seek frameworks that investigate issues of language, race, class, and power from the perspective of how differences (of language, race, and class) are constructed, and what is the dynamic role of power in the orchestration of these differences. Therefore, the focus of research needs to evolve towards students who learn mathematics in a language that is not their home language and become marginalized due to the dominant perspectives on various parts of their language,

racial, and class identities. Possible research directions might consist of stimulating dialogue about interactions among language, race, and class differences as well as issues of power in relation to these differences, rather than examining on its own the topic of language, or that of race, as if they had a pure and fixed existence in the social arena of the mathematics classroom and the institutions. From the very beginning, simple and common expressions such as “native language” and “indigenous people” are strongly charged with issues of power by suggesting that only formerly colonised people are indigenous and their languages native. In our view this discourse of naming “the other” needs critique. Much remains to be done in that direction.

NOTES

- ¹ Setswana is one of the 11 official languages in South Africa. The other official languages are: isiZulu, IsiXhosa, TshiVenda, Xitsonga, Sesotho, Isindebele, Siswati, Sepedi, Afrikaans, and English. According to the 2001 census, Setswana is the primary, or main, language of 8.2% of the population in South Africa, which is the same as the percentage of those for whom English is the primary language.
- ² The existence of a parallel system of special classes for groups of late arrival immigrant students introduces the physical dimension of “access”, together with the social and epistemological dimensions of this notion.
- ³ We use the word “marks” to mean negative stereotypes about people that become substitutes for experience and reduce our understanding.

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