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Mathematics Education and Language Diversity: A Dialogue Across Settings

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In this article, we share our views on language-diversity issues in research in mathematics education. We describe tensions, questions, and myths that we regularly face as researchers. We use similarities and differences in two settings (multilingual classrooms in South Africa and U.S. mathematics classrooms with Latino/a students) to illustrate the complexity of this work and illuminate research findings.

Key words: Bilingual; Equity; Diversity; Language; Latino/a students; Multilingual

The motivation for this dialogue is to share our views on issues in research in mathematics education that are related to language diversity. Our goal is to provide a window into the kinds of tensions, questions, and myths that we regularly face as researchers in this area. Our aim is to use the similarities and the differences in the two settings (multilingual classrooms in South Africa and U.S. mathematics classrooms with Latino/a students) to illustrate the complexity of this work and illuminate some of the research findings that seem to hold across settings. The two of us (Kgethi and Judit) first met in person at a Working Group on Multilingual Mathematics Classrooms at the PME27 conference in Hawai'i in 2003. We have had conversations about our work on a regular basis since then, and we collaborate on the ICMI Study #21, entitled *Mathematics Education and Language Diversity*, which Kgethi cochairs. The dialogue here addresses the following issues that, in our individual and collective experiences, are pertinent for research on and practice in learning and teaching mathematics in linguistically diverse contexts:

- Tensions that arise as a result of doing research on mathematics education and language diversity,
- Recurring questions that often are asked about language and mathematics learning and teaching, and
- Myths about language and mathematics learning and teaching.

This was an invited article and as such did not go through the customary submission process.

We begin by providing some information on our backgrounds and, in so doing, set the scene for our dialogue:

Kgethi: I am multilingual—I can speak, read, write, and understand nine languages, including English and my home language Setswana.[1] This kind of multilingualism is not unusual for a black South African, such as me, who lives in Johannesburg. In fact, given the integration of different ethnic groups, a majority of black South Africans are multilingual and can communicate in at least four languages. Some of the South African languages I speak are also spoken in countries elsewhere in Africa. I get irritated when non-Africans ask me whether the African languages I speak are dialects. I always have to explain that many of the African languages (e.g., Setswana and IsiZulu) differ much more than Spanish and Portuguese differ. It is interesting that Spanish and Portuguese are never seen as dialects, despite the similarities between them. In my view, this is an instance of the influence of the politics of language. Okay, Judit, tell me about your language background and what motivated you to do the kind of research you do.

Judit: I am originally from Argentina, the granddaughter of Jewish immigrants from Eastern Europe to Argentina and Brazil. My grandparents' first language was Idisch, my mother's first language was Portuguese (because she was born and raised in Brazil), and my father's first language is Spanish. My first language is Spanish, and I learned some English in elementary school in Argentina, but I did not consider myself bilingual until after I moved to the United States in high school. My mother tongue is, really, the dialect spoken in Buenos Aires, not some idealized version of Spanish (usually referred to as the Spanish endorsed by the "Academia Real Española" or the Royal Spanish Academy, the equivalent of speaking the "Queen's English"). This version of Spanish has its own pronunciation, pronouns, verb forms, and slang lexicon—including many words that originate in other languages such as Genovese, Quechua, or English. I often have to explain that there are many varieties of any language, that no language is pure, that languages grow through contact, and that mixing up Spanish and English is a skill, not a deficiency.

I taught mathematics at the college level for 8 years before becoming a researcher. I have worked as a teacher and researcher, principally in classrooms with students of Mexican, Puerto Rican, and Central American origin living in the United States. My research focuses on mathematical thinking, learning, and discourse. My interest in bilingual learners blossomed a few years after I completed my dissertation, while working at TERC with the Cheche Konnen Research Center after I received a grant from the National Science Foundation to study mathematical discourse in bilingual settings. My personal experiences of learning a second language as a child, being an immigrant as a teenager, and becoming bilingual as an adolescent sparked my curiosity about bilingualism and second language acquisition. My commitment to improving the education of learners who are from nondominant groups has provided my motivation and has sustained my dedication to tackling these issues. Because I work in both monolingual and bilingual settings, I have had to read across several sets of research literature. In doing this inter- and cross-disciplinary work, I found that, although I remained grounded in my own field, I was forced to use perspectives from fields in which I had little formal training, such as bilingualism and second language acquisition. To develop the necessary grounding to conduct this research,

[1] Setswana is one of the 11 official languages in South Africa. 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 for those for whom English is the primary language.

I read across disciplines and fields. I found that I faced several challenges and recurring issues. Overall, the perspective I bring to these issues is the sociocultural and situated perspective on language and bilingual learners that I describe elsewhere (Moschkovich, 2002) and a history of working as an activist and writer (e.g., Moschkovich, 1981), which preceded my career as a researcher in mathematics education. What about you, Kgethi?

Kgethi: My interest in language and mathematics stems from my experiences both as a mathematics learner and as a mathematics teacher at the school and university levels. In primary school up to grade 4, I learned mathematics in Setswana. The switch to English as the language of learning and teaching occurred in grade 5. Even though I passed my mathematics grade 12 examinations in English, I could not hold a fluent conversation in English. 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. My research on mathematics in multilingual classrooms is motivated by this experience as well as by what I regard as an urgent need to address the uneven distribution of mathematical knowledge and success.

Judit: Kgethi, what is the one question that you have often heard about language and learning mathematics that you would like to clarify?

Kgethi: One question that I always get asked is, "What language should be used for teaching and learning mathematics in multilingual contexts? Should it be English or the learners' home languages?" I find this question to be very problematic, because it creates an unnecessary dichotomy and, thus, an impression that the use of the learners' home languages for teaching and learning must necessarily exclude and be in opposition to English and that the use of English must necessarily exclude the learners' home languages. My view is that in many multilingual contexts the choices are not as simplistic as that [see Setati, Molefe, & Langa, 2008]. I hold a multilingual view, which argues that multilingual learners have unique and specific language configurations, and therefore they should not be compared with monolingual learners. Multilingual learners should not be considered the sum of two or more complete or incomplete monolinguals. Grosjean [1985] uses an analogy from the domain of athletics to explain this different—but complete—language system in multilinguals. He argues that, like high hurdlers who blend high jumping and sprinting, multilingual learners blend multiple language competencies. In my view, restricting multilingual learners to using only one language during teaching and learning is like making a hurdler compete with a sprinter in athletics. Judit, I know you work mainly with bilingual learners. What do you think about this analogy?

Judit: I have always liked this analogy because it shifts the conversation from comparing monolinguals and bilinguals with monolinguals as the norm and instead frames the bilingual mode as one among many modes. I have always disliked the focus on comparing bilinguals to monolinguals because we (bilinguals) then always seem to come out losing: There is no way that I will ever catch up to a monolingual English speaker in terms of developing the number of vocabulary words I know in English, but focusing on that fact discounts the importance of knowing vocabulary in two languages. We could, instead, focus on the multiple ways bilingual learners might describe mathematical situations. For example, a straight line is called a *línea recta* in Spanish. The word *recta* is related semantically to the phrase *ángulo recto* [right angle]. Could this connection inform my mathematical reasoning or how I participate in mathematical discussions about these objects? I could only explore these

questions if I consider mathematical discussions with other Spanish–English bilingual speakers. If I only talk to monolingual speakers, I do not have the opportunity to use my bilingual expertise or resources. So, the expertise and resources that bilinguals bring to mathematical discussions are only visible in bilingual settings. I would like to turn the question around and focus on how we can learn to see more of the expertise and resources that bilingual/multilingual learners bring to the mathematics classroom rather than the limitations these learners experience. Of course, that may also mean that we need to consider how to have more bilingual/multilingual teachers in mathematics classrooms.

Kgethi: Judit, we also need to focus on instructional strategies that can be used in bilingual/multilingual mathematics classrooms that do not require the teacher to be bilingual or multilingual. But what do you think about my concern about dichotomies?

Judit: I agree that questions about "which language to use" presuppose a dichotomy between English and home languages. For me, the question is both about practice (What should we do in the classroom?) and theory/research (How do we conceptually frame the study of mathematics learning?). For practice, I think that the answers depend on several things: If the goal is to support mathematics learning, then any combination of home and instructional languages that supports learning is what should be used.

Kgethi: I agree. However, I still maintain that the teacher does not have to be bilingual or multilingual. What is key is that they understand the complexities of working across multiple languages and know how to support students who struggle with comprehension of mathematics instruction in English. The focus when we teach mathematics is on mathematics proficiency and not language fluency.

Judit: Yes, but if the goal is to develop English proficiency (either oral or written) in mathematical texts (oral or written), then the product should be in English, and instruction should flexibly use home and instructional languages in order to meet this goal. Now, because not all teachers speak the home languages of students, the practical question becomes moot in many classrooms, and the only times that home and instructional languages are combined is when students work and talk amongst themselves. The ideal situation would be if there were an adult who could provide guidance flexibly in both languages, depending on the situation. We know that this is precisely the expertise that bilinguals develop and use, knowing when and how to switch languages in the most useful ways, depending on the situation at hand.

Kgethi: The ideal situation of having bilingual or multilingual teachers is desirable. However, I think we need to think about ways in which monolingual teachers can support the mathematics learning in multilingual classrooms. I think the work of Susan Staats [2009] with undergraduate Somali mathematics students at the University of Minnesota is interesting in this regard. Staats uses audio and video recordings to strengthen Somali students' ability to discuss mathematical principles in their home language and to draw parallels between mathematics and their cultural practices.[2] Anyway, Judit, you wanted to talk more about dichotomies.

Judit: Yes, the research/theory question raises two issues for me. One is that I do not see dichotomies such as home/school language, informal/formal language, everyday/academic language, and monolingual/bilingual as being theoretically productive or as reflecting reality. What I mean is that these dichotomies may have been useful at one time to conceptualize the relationship between language and learning, but they no longer serve the goal of pushing our theorizing. Although they may reflect our

[2] For a detailed discussion, see Staats, 2009.

"folk theories" of language, they certainly do not reflect contemporary theoretical views or empirical descriptions of how people use language. It reminds me of the switch to a view of light as having the properties of both waves and particles: It is a major paradigmatic shift, and it may not match our everyday experiences, but it nevertheless is true.

Kgethi: The truth is that we use dichotomies constantly in our work, and we do so in order to understand phenomena that we are exploring. We, however, have to be aware when dichotomies are no longer helpful. The one dichotomy that concerns me has to do with theoretical perspectives. We sometimes draw a separation between work that emerges from the cognitive perspective and work that emerges from the sociocultural and sociopolitical perspective. This creates an impression that these are—or ought to be—in opposition. Most of the work in mathematics education emerges from a cognitive perspective; however, in the mid-1980s a "social turn" [Lerman, 2000] became evident in mathematics education research and signaled a shift of attention away from descriptions and explanations of mathematics learning as a function of simply individual cognition. My view is that research and practice in our field of study needs to recognize and acknowledge language as political, because, without such, we will fail to understand and work with the demands that teachers in multilingual classrooms face [Setati, 2005]. In my recent work, I argue that the contradictions between research advocating for multilingual practices and dominant language practices that emphasise access to English are a result of this dichotomy between theoretical perspectives. Policy and research that advocate for multilingual practices are largely informed by a cognitive perspective and have not considered the need for access to social goods that people at the grassroots level want and think they can only get by gaining fluency in English (i.e., the political role of language).[3] In my view, to understand these complexities of teaching and learning mathematics in multilingual classrooms, we need to draw from work based on different theoretical perspectives.

Judit: Yes, the political nature of teaching, research, and language take me back to the question of how a monolingual teacher can teach mathematics in a multilingual classroom. Using the learners' home languages is not the only way to address issues of language and power in the classroom, as you suggested. There are examples in mathematics education of work that proposes other ways to address issues of language in the classroom. As far as the tensions between using cognitive and sociocultural or sociopolitical perspectives and how we can recognize and address how language is political, you and I have been talking about this issue for quite some time. On the one hand, I can see how one could look at my work and say that it addresses issues of power and the political nature of language simply because I focus on students from nondominant communities who are bilingual, learning English, and so on.

Kgethi: I think my work addresses the political nature of language, and I have found your work very useful in this regard.

Judit: For me, what I do is not enough to address issues of power. I also use a theoretical framework that focuses not on deficits but on the resources learners have that teachers can use to support learning; in Vygotskian terms, I focus on *the potential for progress in what learners already know and do*. That move, to me, reflects a fundamental epistemological stance toward knowing and power (or as we say in Spanish, *saber y poder*). In Spanish, these terms are polysemic (now there's a powerful word!)—they have multiple meanings. They can be interpreted as both

[3] For detailed discussions on this, see Setati (2005) as well as Setati, Chitera, and Essien (2009).

verbs and nouns. So they can be translated as actions, as in "to know and to be able to," or they can be translated as objects, as in "the knowledge and power." In any case, that move, for me, is fundamentally about shifting our analysis of where the power lies, perhaps not because I endorse any particular political action (for me that involves collective action), but because I am requiring a shift in the analytical focus from deficits to resources.

Kgethi: The shift in the analytical focus that you are talking about is a political shift, which, in my view, signals recognition of the fact that language is not benign. My view is that language is always "political," and this view emerges from Gee, who argues that it is political in the sense that it has implications for how "social goods" are or ought to be distributed [Gee, 1999]. When we speak, we create a "political" perspective about ourselves. We may not be doing it deliberately. However, through our talk [the language we use and how we use it], we project ourselves as certain kinds of people engaged in certain kinds of activity.

Judit: I know that, for some researchers, it is not enough to say that I am addressing issues of power or using a sociopolitical perspective. There are researchers who address issues of power more directly and explicitly, say, by looking at student positioning during discussion in mathematics classrooms, or questions of who-gets-to-talk-when or what discourses are reified in mathematics classrooms, and so on. I do see how these approaches are also necessary. However, my approach is to do what resonates with my epistemological stance, training, and vision. And I can only do research or analyses that are grounded in some kind of empirical data or examples (this could be the result of my training in physics). I do find that practitioners and mathematicians are more convinced by concrete examples from classrooms than by abstract ideas about power. What do you think about these tensions?

Kgethi: I agree that many people are generally convinced by concrete examples from classrooms, but I think it depends on the question that is being explored. Although I also like to do research or analysis that is grounded in some kind of empirical data, I also know that not all research questions can be answered through an analysis of empirical data. My view is that researchers who do not do analysis that is grounded in some empirical data draw on other kinds of data. So the question that you are essentially asking, Judit, is "What counts as evidence in this field of study?" Because I do not want us to be carried away by this issue that I think could be discussed in an entire article, I only want to point out that this matter is, in fact, covered in a book entitled *What Counts as Evidence in Linguistics* [Penke & Rosenbach, 2007]. One thing I found interesting is the fact that many of us who do research do not talk much about issues of race and language. I know I do not, and there is a reason. However, I am also fascinated by this issue in your work, Judit. Many mathematics classrooms in the United States are multilingual, however, you focus only on bilingual learners. In fact, in your work, you never talk about multilingual or bilingual classrooms, but you talk about bilingual learners. So, your focus is specifically on Spanish learners in the United States who learn mathematics in English, and for those who are not aware, it may seem as if there are no other language varieties in the classrooms in which you work or in the United States in general.

Judit: Yes, I do focus on a particular student population. Many researchers in the United States focus on Latinos/as (by the way, students in this category can also be called Hispanics, Mexican-American, Puerto Ricans, or Central Americans). I focus on this student population for several reasons: These students have been documented as not doing well in school and especially underachieving in mathematics, and Latinos/as are a large and growing population in the United States—especially in California and New York, but, in fact, in other regions of the United States as well.

Also, there is a dearth of research on Latino/a learners in mathematics; we need much more work that addresses this student population. In terms of why I chose to use the term *bilingual*, that has a history as well. Bilingual education has a long history of both research and activism, and I personally identify with that history. The label *bilingual* by no means applies to all Latino/a learners in U.S. schools. There are many Latino/a students who were born in the United States, whose families have been in the United States for several generations, and who may hear or speak a little bit of Spanish at home (for example, when they talk to their grandparents who may be Spanish dominant or when they visit family back in Mexico), but are, in fact, monolingual English speakers. This population of students may be described as speaking Chicano English as their vernacular. Then there are Latino/a students who are immigrants and came to the United States (some of these may have emigrated more than once or live in the borderlands and move easily between the United States and Mexico), and we think of those students as bilingual.

Kgethi: Could you talk about why you use the label *bilingual*?

Judit: I purposefully chose the label bilingual over English learner for two reasons. One is that it focuses on what students know and can do (speak two languages) instead of what they do not know (English). The second reason is that currently, I think that the label *English learner* in the United States can be used as a label for the students who are not doing well, which really means Latino/a students in poor schools. When teachers or researchers say that we need to address issues of language in mathematics for English learners, they are usually not, in fact, concerned about the mathematics learning of English learners who are in middle-class or upper-class schools or English learners who are Asian (in the United States the assumption is that they are high achievers in mathematics). If we probe further, they are usually using this label to stand for those Latino/a students who are poor and not doing well in school.

Kgethi: My point exactly! You are using the label bilingual as a proxy for race and socioeconomic class. I have been critiquing my own use of the label *multilingual*. Given the multilingual nature of South Africa, it may be argued that all mathematics classrooms in South Africa are multilingual; however, I deliberately focus on multilingual classrooms in black South African township schools. Clearly, I am using the label *multilingual* as a proxy for race and socioeconomic class. Frankly speaking, I have deliberately avoided an explicit focus on race, because it is such an emotional issue for me. As a black South African, I find it a challenge to talk or write about race without becoming emotional. In South Africa, the issue of language has always been interwoven with the politics of domination and separation, resistance and affirmation. During apartheid, the language of learning issue became a dominating factor in opposition to the system of Bantu Education (Reagan & Ntshoe, 1992). The opinion of black South Africans never became reconciled to the extension of home language learning beyond grade 4, or to the dual medium policy (of English and Afrikaans) in the secondary school (Harsthorne, 1987). The 1976 uprising, which began in Soweto and spread throughout the country, was initially sparked by the promulgation of a language policy that prescribed the use of Afrikaans[4] as a language of learning and teaching for all black children in secondary school. It is also well known that, in South Africa and in many other African countries, change in the language policy of a country is often linked to change in political power.

But Judit, your situation is interesting because there are many bilingual or multilingual immigrant non-Latino/a students in poor schools who need the attention of mathematics educators and researchers.

[4] For many Black people, Afrikaans was regarded as the oppressor's language.

Judit: Yes, of course there are many more languages besides Spanish spoken in classrooms and in homes in the United States. But the majority of English learners (about 80%) are, in fact, not only Latinos/as but also Mexican-Americans [Planty et al., 2008]. This is not to say that there are not other English learners in the United States who need the attention of teachers and researchers. I choose to focus on the students who are the majority of English learners and who have been historically framed by deficit models in terms of their abilities to learn, in particular to learn mathematics. In fact, the label English learner, as used in the United States, is vague, has different meanings, is not based on objective criteria, does not reflect sound classifications, and is not comparable across states or equivalent across settings [Gándara & Contreras, 2009; Moschkovich, in press]. In California, 25% (1.5 million) of the children in public schools in 2001 were labeled English learners and 83% of those children spoke Spanish as their primary language [Tafoya, 2002]. To add to the complexity, some of the Latino/a children in U.S. classrooms may, in fact, not be native Spanish speakers but may have been raised speaking a native language (such as Maya or Purepecha) at home, and so are, in fact, multilingual. (I do not have data on this student population in the United States in terms of which languages, how many students, and so on, so I hesitate to say much about this student population). I have stopped referring to *bilingual classrooms* because, in the United States, that label can refer to so many different instructional situations. Because my area of scholarship is not bilingual education, I chose to focus on the learners rather than the classrooms. I have learned so much about language diversity and complexity in South Africa; can you tell me a bit about how you think language diversity impacts mathematics learning and teaching?

Kgethi: Learning mathematics has elements that are similar to learning a language. As when learning a language, when learning mathematics, students have to learn new terminology and symbols, how to use them in conversation, and the different ways in which mathematics terminology is used in different contexts. As Gee [1999] would put it, students are essentially learning how to act, interact, think, value, talk, write, and read in mathematically appropriate ways with appropriate props in the appropriate places. If they are learning mathematics in a language that is not their home language, then their task is even more demanding, because they have to learn to do all of the above in a new language that they are still learning. This places additional demands on their mathematics teachers, who face the major demand of continuously needing to teach both mathematics and the language in which it is learned [e.g., English] at the same time.

In closing, we want to acknowledge that this dialogue is only a beginning in terms of opening an avenue for further dialogue. We have only briefly touched on issues that are complex on multiple levels: intellectual, political, and personal. We encourage practitioners and researchers to consider the language diversity in their own backgrounds and in their current settings for practice. For example, even people who are monolingual English speakers have experienced language varieties that are regional (e.g., a Boston accent, the name for a paper bag in different regions) or related to socioeconomic status, age, and other aspects of identity (e.g., varieties of British English in the film *My Fair Lady*, teenage slang, lyrics to music). All of these examples illustrate that language diversity is the norm, not the exception. Language diversity is not an issue that is only relevant to bilingual/multilingual

classrooms or that is only a result of migration and/or segregation—language diversity is inherent in the very nature of human communicative activity and competence.

We also want to acknowledge that there are many issues that we have omitted from this dialogue. In particular, we have not discussed specific teaching methods or approaches that mathematics teachers can use in their classrooms to support English language learners. Neither have we addressed specific teaching strategies for monolingual teachers working in bilingual/multilingual classrooms. We suggest that practitioners and researchers explore further the readings that follow. We have made a few suggestions for readings that may be especially useful to practitioners.

REFERENCES

Gándara, P., & Contreras, F. (2009). *The Latino education crisis: The consequences of failed social policies*. Cambridge, MA: Harvard University Press.

Gee, J. P. (1999). *An introduction to discourse analysis: Theory and method*. London: Routledge.

Grosjean, F. (1985). The bilingual as a competent but specific speaker-hearer. *Journal of Multilingual and Multicultural Development, 6,* 467–477.

Harsthorne, K. B. (1987). Language policy in Africa education in South Africa, 1910–1985, with particular reference to the issue of medium of instruction. In L. W. Lanham & D. Young (Eds.), *Bridging the gap between theory and practice in English second language teaching: Essays in honour of L. W. Lanham* Pretoria: Maskew Miller Longman.

Lerman, S. (2000). The social turn in mathematics education research. In J. Boaler, (Ed.), *Multiple perspectives on mathematics teaching and learning* (pp. 19–44). Westport, CT: Ablex.

Moschkovich, J. N. (1981). "---But I know you, American woman." In C. Moraga & G. Anzaldúa (Eds.), *This bridge called my back: Writings by radical women of color* (pp. 79–84). Watertown, MA: Persephone Press.

Moschkovich, J. N. (2002). A situated and sociocultural perspective on bilingual mathematics learners. *Mathematical Thinking and Learning, 4,* 189–212.

Moschkovich, J. (in press). *Language and mathematics education: Multiple perspectives and directions for research*. Charlotte, NC: Information Age Publishing.

Penke, M., & Rosenbach, A. (2007). *Benjamins current topics: Vol. 7. What counts as evidence in linguistics: The case of innateness*. Amsterdam: John Benjamins.

Planty, M., Hussar, W., Snyder, T., Provasnik, S., Kena, G., Dinkes, R. et al. (2008). *The condition of education 2008* (NCES 2008-031). Washington, DC: Institute of Education Sciences, U.S. Department of Education. Retrieved July, 27, 2010, from http://nces.ed.gov/pubs2008/2008031.pdf

Reagan, T. G., & Ntshoe, I. (1992). Language *policy and black education in South Africa. In I. A. Stevenson (Ed.), Sociolinguistics for applied linguistics*. Pretoria: University of Pretoria.

Setati, M. (2005). Teaching mathematics in a primary multilingual classroom. *Journal for Research in Mathematics Education. 36*, 447–466.

Setati, M., Chitera, N., & Essien, A. (2009). Research on multilingualism in mathematics education in South Africa: 2000–2007. *African Journal of Research in Mathematics, Science and Technology Education, 13*(1), 64–79.

Setati, M., Molefe, T., & Langa, M. (2008). Using language as a transparent resource in the teaching and learning of mathematics in a grade 11 multilingual classroom. *Pythagoras, 67*, 14–25.

Staats, S. (2009). Somali mathematics terminology: A community exploration of mathematics and culture. In R. Barwell (Ed.), *Multilingualism in mathematics classrooms: Global perspectives* (pp. 32–46). Bristol, UK: Multilingual Matters.

Tafoya, S. M. (2002). The linguistic landscape of California schools. *California Counts: Population Trends and Profiles, 3*(4) 1–15.

RECOMMENDED READINGS FOR PRACTITIONERS

Moschkovich, J. N. (1999). Supporting the participation of English language learners in mathematical discussions. *For the Learning of Mathematics, 19*(1), 11–19.

This article describes how a teacher supports English learners during a lesson in a third-grade classroom.

Moschkovich, J. N. (2009). Using two languages when learning mathematics: How can research help us understand mathematics learners who use two languages? Research Brief and Clip, National Council of Teachers of Mathematics, Retrieved July, 27, 2010, from http://www.nctm.org/uploadedFiles/Research_News_and_Advocacy/Research/Clips_and_Briefs/Research_brief_12_Using_2.pdf

This short NCTM "Research Brief" describes how research can help us understand mathematics learners who use two languages.

Moschkovich, J. N. (2009). How language and graphs support conversation in a bilingual mathematics classroom. In R. Barwell (Ed.), *Multilingualism in mathematics classrooms: Global perspectives* (pp. 78–96). Bristol, UK: Multilingual Matters.

This article is an example of a mathematical discussion in a bilingual eighth-grade classroom in the United States.

Setati, M., Molefe, T., & Langa, M. (2008). Using language as a transparent resource in the teaching and learning of mathematics in a grade 11 multilingual classroom. *Pythagoras, 67*, 14–25.

This article describes a strategy for teaching mathematics in multilingual classrooms. It describes the results of the implementation of the strategy in a Grade 11 mathematics classroom in South Africa.

Staats, S. (2009). Somali mathematics terminology: A community exploration of mathematics and culture. In R. Barwell (Ed.), *Multilingualism in mathematics classrooms: Global perspectives* (pp. 32–46). Bristol: UK: Multilingual Matters.

This article presents ways in which educators who do not share a home language with their students can create opportunities for the students to draw on their home languages and culture.

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