LESSONS LEARNED FROM THE CENTER FOR THE MATHEMATICS EDUCATION OF LATINOS/AS[1]: IMPLICATIONS FOR RESEARCH WITH NON-DOMINANT, MARGINALISED COMMUNITIES

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This paper centres on research on equity and mathematics education in Mexican American communities in the United States. This research is grounded on a socio-cultural perspective and encompasses work with teachers, students, and parents. We address questions such as: What are Latino/a immigrant parents' perceptions of mathematics instruction? What do teachers see as obstacles and advantages in the mathematics education of non-dominant students? How does language policy affect students' participation in the mathematics classroom? The findings are likely to be relevant to other settings with immigrant students and non-dominant students.

Some context

My entry into mathematics education was in great part through my experience as a Teaching Assistant for mathematics content courses for preservice elementary teachers. I became fascinated by how students made sense out of mathematics, and in particular those students who are not considered "successful" in mathematics by the traditional measures of success. As I write in Civil (2002):

> I became intrigued by the fact that the 'more successful' were less likely to make use of 'informal' methods, everyday type reasoning, and would rather use a formula, algebra, school-like methods. The 'less successful' were often trying to make sense of the problems, making connections to everyday life. (p. 135)

One of those "less successful" was Vicky, a preservice elementary teacher, who wrote in her journal, "There is hope yet when I can legally use my methods to solve a problem." Her words are a constant reminder of how crucial it is that we listen to our students' ideas and emotions about mathematics. Vicky's approach to problems showed great insight and deep understanding, yet she did not seem to value it as much as her peers' algebraic approaches. Preservice elementary teachers appeared to have rigid beliefs about what and how to teach in mathematics, beliefs largely grounded on their unsuccessful encounters with this subject (Civil, 1993). I could not help but wonder how they were going to respond to children's ideas about mathematics. When I shared

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alternative algorithms that children may have used, the prospective teachers would often attribute them to "gifted children." Years later, when I shared algorithms that immigrant children might bring with them, prospective teachers' comments such as, "how can we be expected to know all these different ways?" or "This is nice but they need to learn to do things the U.S. way," underscored for me the urgency to prioritize issues of equity in mathematics teacher preparation. Now I continue to wonder about the question of how teachers will respond to children's ideas about mathematics and I am particularly interested in how the sociocultural context of students may play a role in teachers' perceptions of students as doers of mathematics. In the last few years several projects across the world seem to be concerned with the need to make equity issues prominent in mathematics teacher education. But, as Gates and Jorgensen (Zevenbergen) (2009) write, in reference to two special issues of the Journal of Mathematics Teacher Education (JMTE) on social justice and mathematics teacher education:

> The publication of these two Special Issues is testimony to the continued concern in the mathematics education community over the problems of social justice, and the real need to bring it to the attention of mathematics teachers. However, we do need to ask—why has it taken so long? Why isn't everybody—or at least more people—concerned about social justice? … Surely few would claim that the social conditions of our pupils were not our concern. Yet, we claim that is exactly what does happen in the field of mathematics teacher education—to a great extent. (p. 165)

As I write this, another special issue from that journal on equity is almost ready. We could also raise the question of why "special issues" on these topics? What does that say about this topic in relation to what some call "mainstream" mathematics education research? As Martin, Gholson, and Leonard (2010) write in reference to the Journal for Research in Mathematics Education (JRME) special issues on equity, "In many ways this practice has helped to relegate these issues and the authors of such scholarship to the margins" (p. 15). This separation between "mainstream" mathematics education research and equity research issues in mathematics education is quite problematic. I have argued before (Civil, 2006) for the need to bring together cognitive and sociocultural approaches to address the complexity of doing research in mathematics education, particularly when working in minoritised communities. In the next section I give some insights from a line of work in which we sought to develop mathematics learning environments that built on children's and their families' backgrounds and experiences. My focus will be on the importance of listening to students' ideas about mathematics and of paying attention to the students' context.

Listening to students

I have written elsewhere about the challenges and the affordances in developing learning experiences that build on community knowledge (Civil, 2002; 2007). Some of the issues encountered have to do with our valorisation of knowledge (Abreu, 1995), what we count as being "valid" mathematics in a school context, for example; other related issues have to do with our own limitation to see mathematics in everyday practices, due in part to our background in "academic" mathematics (González, Andrade, Civil, & Moll, 2001). Over the years, when reflecting on our work in connecting home and school mathematics, I have often raised the question of "where is the mathematics?" (Civil, 2007). The garden project (Civil, 2007; Kahn & Civil, 2001)

was one example of an experience in which we explicitly blended sociocultural and cognitive approaches to address this question of "where is the math?". This project grew out of a teacher's noticing that several of her students' families had extensive knowledge and experience with gardening. The teacher decided to create small container gardens just outside her classroom and invited parents to come and help out with their knowledge as well with resources.

One of the mathematics topics explored through the garden project was that of area and perimeter. These concepts were grounded on the children's experiences with the gardens that they tended to as part of this project. These gardens were enclosed in chicken wire (to protect them from desert creatures) and had to be covered with plastic during the winter nights. The gardens consisted of plants in pots since the ground outside the classroom was not conducive to planting. One real problem that the students (9-and-10-year-olds) encountered was how to maximize the space inside the enclosed gardens with the limited (and fixed) amount of chicken wire they had. From a practical point of view, we could argue that they did not need much mathematics to solve it. Students pulled here and there on the enclosure and crammed as many pots as they could. From a mathematical point of view, it is an optimization problem. We explored this problem in the classroom context, with artificial "gardens" made by a 3 feet string that they glued to poster board to make "gardens" for which they had to find the area (Civil & Kahn, 2001). Then, after the garden module was over and towards the end of the school year, I conducted task-based interviews with four students. Here is where I learned about Vickie's thinking of linear units and square units. While she seemed to indicate that it did not make a difference whether one used centimetres or square centimetres for area, when talking about the plastic to cover she said square feet:

> Marta: OK, what about the feet? Because in the feet you told me very confident you said, "square feet" Could I have said that the area of this is 15 feet?
> Vickie: You should say square feet.
> Marta: OK, why do you think that?
> Vickie: Because they wouldn't know what you mean you might say 15, 15 triangle feet or something.

The "they" in the last line was in reference to the people at the store where they sell the plastic to cover the gardens, a connection to outside school knowledge. Feet and inches are units that were familiar to them in their everyday context, while centimetres were more tied to the school context. Vickie may have known that in everyday life one uses "square feet" when talking about covering, but what this term meant to her remains to be seen, given her reference to triangle feet. Another student, Nathan, seemed confident that the shape with largest area (for a fixed perimeter) would be a circle, but when I probed him further, he added that for this particular task (where we were using square tiles to cover the area), a square would work best:

> Nathan: Well, our plant things were squares… I mean were circles, but I think that it would have to be like a square this way, to hold more because these are square units. Because, I mean you can't cut a plant holder in half…. Umm, well because circles will fit into circles right? … I mean you can fit circles into squares, but it is hard to fit a square into a circle…. I mean it's like if you wanted to fill up the edges you would have to cut it in half.

Once again, we see a connection to the real life experience, here with the fact that the pots in the real garden were circular but in the task-based interview we are using squares to find the area (but for Nathan, these become also the "pots"). And finally, there is Jimmy, who was very patient with me as he tried to help me understand his reasoning for why the perimeter of a 9 cm by 2 cm rectangle was 8 cm. His explanation was based on a kinaesthetic experience that they had had in which they had created rectangles by lying down on the floor and counted from head to waist as 1 unit, and from waist to feet as another unit. So he drew a rectangle as if composed of 4 people, one per side and thus came up with an answer of eight.

These are very brief snippets on three students' thinking about area and perimeter in the context of a project that was meaningful to them, judging by how eager students were to work in their gardens, talk about them, and engage in mathematical activities that were somewhat grounded in their experiences with the gardens. We made it clear to the students that we took their ideas seriously and in turn they took our questions and requests for explanations seriously. These experiences trying to connect home and school mathematics were fundamental to my most recent work, as they reinforced my view of the need for a holistic approach to the mathematics education of non-dominant students. Such an approach involves researchers listening to all interested parties, in particular parents, students, and teachers. I turn next to some lessons learned from this listening.

Listening to parents

Parental involvement in my context is typically associated with physical presence of parents in the schools. Thus, if "parents don't come to school" it often contributes to schools' (teachers', administrators', even other parents') deficit views of parents, particularly in working-class, non-dominant communities (Civil &Andrade, 2003). Our work with Latino/a parents is based on a redefinition of parental involvement. It is grounded on the literature on parental involvement from a critical perspective (Calabrese Barton, Drake, Perez, St. Louis, & George 2004; Delgado-Gaitán, 2001; Valdés, 1996) and draws on the concept of cultural and social capital applied to parental involvement (Lareau and Horvat, 1999). A key concept in our work is that of parents as intellectual resources (Civil & Andrade, 2003), which implies a need to learn about parents' views and understandings of mathematics to engage them in an authentic partnership with schools. I concur with Valdés (1996) when she expresses her concern for any effort at parental involvement that "is not based on sound knowledge about the characteristics of the families with which it is concerned" (p. 31).

As I point out in Civil (2008; in press), immigrant parents in different parts of the world share several perceptions about the teaching and learning of mathematics. For example, one such perception is that schools in the receiving country are less demanding in both discipline and content than the schools in their country of origin. How do we learn from parents about their perceptions on the teaching and learning of mathematics? We have taken several avenues to do this: ethnographic household visits; mathematics workshops with parents; mathematical "tertulias"; and classroom visits (Civil & Quintos, 2009). I describe each of them briefly here, but my focus will be on the classroom visits. The ethnographic household visits are grounded on the concept of Funds of Knowledge, which are "these historically accumulated and culturally

developed bodies of knowledge and skills essential for household or individual functioning and well-being" (Moll, Amanti, Neff, & González, 2005, p. 72). These household visits were my entry into the world of working with parents and most specifically trying to see schools from their point of view.

The idea of mathematics workshops with parents originated through some of these household visits, as parents (mothers mostly) expressed an interest in knowing more about the mathematics their children were learning in school. This led to a large parental involvement project in mathematics where among other activities parents participated in short courses (about eight two-hour sessions) on a variety of mathematical topics (numbers and operations; algebra; geometry; data analysis, etc). These courses allowed us to establish rapport with the parents and in time learn about their ideas about the teaching and learning of mathematics as they engaged as learners of mathematics themselves. The "tertulias" emerged from this work. We borrowed this term from Spanish, where it is related to the idea of gatherings in cafes or people's homes to discuss literature, poetry, or art. Our mathematical "tertulias" (mathematical circles) are arenas for doing mathematics but also for engaging in a critical dialogue about issues related to mathematics education. For example, through these tertulias we learn about parents' concerns that their children are not being taught basic skills such as the multiplication facts; or we learn about their views on the algorithm for division in the U.S. as compared to the one in Mexico (Civil & Planas, 2010); or about their expectations for more homework and a stricter approach to schooling. Some of these issues also come up in the debriefing of classroom visits. This last approach has proven to be particularly useful towards engaging with parents in a dialogue about teaching and learning mathematics. The visit to a mathematics class provides a shared experience that we believe facilitates this dialogue while allowing for our beliefs and values to emerge.

A visit to a mathematics classroom

To illustrate aspects of the process and some findings I have chosen a visit to a 7^{th} grade classroom (age 12) in which 5 mothers, a parent liaison, and a graduate student participated. The topic of the lesson was order of operations. All the observers had a sheet with some questions to guide the visit (e.g., "what does the classroom look like?"; how would you describe the participation in this classroom?" "What kinds of problems / questions were posed in this class?"). During the debriefing we use these questions as starting points for the conversation. For instance, for the question "what does the classroom look like?", all the mothers were in agreement that there were too many distractions and non-mathematics related objects (posters, family pictures, etc.). Unpacking these observations led to several comments pointing to a shared preference for a more teacher-centred classroom. For example, the mothers were concerned about the way the desks were arranged in the classroom. Students were sitting in groups and their concern was that no matter how, some of them were always with their back to the board. The mothers questioned the value of being in groups:

> Berenice: Well, I think there is more distraction by being in a group all the time… rather than being individually. You're there by yourself attentive to what, to what the teacher is going to say…
> Dolores: Or many times, if you're in a group, the other one is going, is going to copy the one who, who…

Berenice: Yes.
Dolores: Who is doing it right. So he is going to depend on the one on the side.
Berenice: On the neighbour.
Dolores: I think that by being individually they learn better. They work harder.

Along the lines of a teacher-centred approach, some of the mothers wondered about the role of one female student who seemed to be mostly helping other students. What was she learning? the mothers wondered. This concern was reinforced because one of the mothers noticed that this girl had used a calculator to help one of the groups but had come up with the wrong answer. The mother wondered whether the teacher was going to notice that or whether she trusted this girl as her assistant.

To be expected the mothers use their own experience from when they were in school as one of the lenses through which they view this classroom experience:

Carlota: the tables were not like that [when she went to school]. We would sit normal…. There were no tables; everybody always facing the front. The board was always in the front. There were no boards around. Only in the front and they would just write down what they were going to teach you in the class, and here I saw a lot of things written, which I don't know if they're going to go over them or if they went over in another class, I don't know. That's how I was taught. Facing the front and the board and that was it.
Reina: The same for me, and when we finished the board would be erased and we would start over the next day, and now when we got in there, there were already some calculations on the board.
Carlota: It was written already. … But, but not in ours, because in our case children wouldn't leave the classroom. I mean, you stay in your classroom and the teachers would come in… but not here, you have to leave running, you go to your next class and you go to the next one, but not over there.

Notice how in the first line Carlota says, "we would sit normal" to describe her experience in school in contrast with what she saw in this classroom. They wonder about boards with parts of mathematics lessons already written on them, as opposed to seeing the lesson unfold in the class. They also noticed that teachers stay in the classroom and that students are the ones who switch. These observations point to aspects of the cultural script that is associated with teaching in different countries (Stigler & Hiebert, 1999). Discussing the implications for the teaching and learning of mathematics of these different cultural scripts is something that could be pursued with parents (and teachers).

The mothers were quite engaged in this conversation as they expressed their opinions about pedagogical issues such as group work and the flow of instruction. A concern for distraction was quite prominent in this debriefing. Students should be attentive, facing the board, working individually. Marianela, another mother says, "It's real casual… like one table, a boy finished but the other two didn't, then he started to talk, but it wasn't about math. So they should only talk about the math problems, not about other things."

Much of the mothers' talk could be associated with the tension "reform-traditional." Whether it is about the pedagogical approach (e.g., group work) or what to learn, as I illustrate next, we could argue that tensions are normal, generational, etc. But it has to be seen also through the power lens, by which I mean that low-income, immigrant parents' voices are often not heard in the school setting.

In terms of what to learn, two recurrent topics are the division algorithm, in which Mexican parents comment that their method is more efficient and requires mental arithmetic as the subtraction is done in the head (see Civil & Planas, 2010), and the fact

that their children are not being asked to know their multiplication facts, while in Mexico they would. The mothers noticed that among the many things posted on the classroom walls were the times tables. One of them commented:

> Carlota: They [teachers in Mexico] never posted the tables on the walls for us…. They would tell you "This table is for tomorrow and learn it," and there we are "Taca, taca, taca," like a little machine, and backward and forward… I struggled a lot with my daughter. She's in sixth grade and I can't tell you she knows the multiplication facts. I can't tell you, and I struggled a lot with her. I tried every possible way, but what happened? That in Mexico the teacher demands for you to know the facts, but here the teacher doesn't. I mean, he gives you that little table [in reference to printed multiplication tables] and, and the child doesn't learn it. I'm like a crazy woman over here "Honey, learn it," and if the teacher doesn't demand it, I'm just like a crazy woman.

Carlota is not alone is expressing her frustration as to what many parents see as a disconnect between what they expect from schools in regards to their children's education and what schools do. Recurrent issues that parents bring up in the debriefings and focus groups are: lack of homework; teachers do not demand enough; not enough emphasis on learning the facts (e.g., multiplication); loose sheets of paper instead of note taking and a notebook; lots of distractions; approaches to doing mathematics that are seen as inefficient and do not stress mental arithmetic (e.g., division). Some parents, however, do comment on the fact that the approaches that they (and their children) are currently learning put more emphasis on understanding the why behind the procedures instead of rote memorisation. I have often argued for the need to have spaces in which parents can get experiences with the mathematics their children are learning (and the pedagogical approaches) and most importantly, opportunities to engage in dialogue about these experiences. In particular, it is important to develop a dialogue between parents and teachers / school personnel. In a large parental engagement project we had teams of teachers and parents facilitating mathematics workshops in the community. This allowed us to explore power issues as some teachers saw themselves as the experts in the teaching of mathematics and were quite critical of having parents teaching these workshops because they did not have the "proper preparation." A few parents asserted their right to be facilitating these workshops since they were participating in the same leadership development program along with the teachers. Furthermore, they saw themselves as better positioned to reach out to other parents since they were also parents in the community (see Civil & Bernier, 2006, for more details on these power issues parents-teachers).

In our current work, consistent with the need for a holistic approach to the mathematics education of non-dominant students, we have been working with teachers using a Teacher Study Group (TSG) format in which teachers and university researchers meet regularly to reflect on the teaching and learning of mathematics with an emphasis on equity. We worked with 26 teachers teaching grades 2 – 8 (ages 7-13) in two Teacher Study Groups (TSG). The overarching goals for the two TSGs were to enhance teachers' mathematical understanding, primarily through focusing on students' thinking, and to engage in conversations about the role of language and culture in the teaching and learning of mathematics. I turn next to some of our findings from listening to teachers in the TSG sessions.

Listening to teachers

At MERGA in 2009 I described some of the characteristics of the work with the two groups of teachers (Civil, 2009) and shared some of the findings with respect to what teachers see as obstacles and advantages in the mathematics education of non-dominant students. In particular I pointed out that engaging teachers to talk about the role of language and culture in the teaching and learning of mathematics was not easy. With the second group of teachers a prominent theme was that of teachers invoking the culture of poverty as an "explanation" for the students' performance in mathematics. However, as Gorski (2008) points out,

> The myth of a "culture of poverty" distracts us from a dangerous culture that does exist—the culture of classism. This culture [of classism leads]…into low expectations for low-income students…. The most destructive tool of the culture of classism is deficit theory… [which suggests] that poor people are poor because of their own moral and intellectual deficiencies. (p. 34)

In this section I focus on listening to the teachers as they talk about their students' families. I do that to further stress the need for dialogue parents-teachers. When we asked teachers what they perceived as being obstacles to the mathematics education of non-dominant students, many mentioned the home environment. Teachers' concerns ranged from parents' low levels of schooling, therefore not being able to help their children with homework to "parents not caring about their children's education" because they were not seen in the school. As I mentioned earlier, in my context, physical presence of parents at school is often used as an indicator of parental involvement. This is a narrow and not culturally responsive view of parental involvement. The topic of parents not caring / not valuing education came up several times during our TSG sessions. There are several avenues to challenge these deficit views, and a particularly powerful approach is through the concept of household visits in the Funds of Knowledge project (González, Moll, & Amanti, 2005). Another approach is through discussion of readings and experiences and having teachers offer alternative explanations when this issue is brought up. For example, in the exchange below, Olivia expresses her frustration at what she views as a lack of responsibility in her students (8-year-olds) and she attributes it to their parents. Michael offers a counter explanation.

> Olivia: When we hear about parents who are home, who stay at home and don't do anything, and you try to contact them, you try to have them coming to the classroom, and they make no response. That's frustrating. Like, I always tell my kids, "You have to be responsible. Your parents go to work. That's their responsibility. You're responsible for coming here and learn", and they all say to me, "My mom doesn't work. My dad doesn't work", blah, blah, blah, so they don't see that responsibility. So it's really, I mean, I think we're all sympathetic when we see that someone is struggling, and we do whatever we can to support them, but, on the other hand, when we see parents who are just, "Here, take my kid," then that becomes difficult.
>
> Michael: I had a parent who was unresponsive and her kid, who was really bright, was coming in late a lot and missing school a lot and it was really getting to be worrisome, and I could not get her to come in for a conference, and then finally, when she did, what I found out is that she had her sister's kids in the house with her because her sister is being deported, and one of these kids has a lot of mental health issues and it's just disrupting their entire home, and so it's really difficult to get all these kids ready for school in the morning, whether she works or not and that's the reason why the boy wasn't getting to

> school on time, because his cousin is disrupting their home life, and so I didn't understand that until I finally got to sit down with her. So, the point about being persistent with people and not making assumptions is really important, because once I got to talk to her, I could see she was definitely committed to her son's education, but she's just facing a lot of real challenges and getting it there. [TSG, May 2009]

Olivia's talk captures many of the stereotypes that I have heard in my work with teachers in non-dominant communities: "they stay at home and don't do anything" (how do we know they "don't do anything"? They could be having a situation similar to the one in Michael's case; or they may not be able to work for a variety or reasons, including immigration status); they do not come to school (how welcoming are schools? How is the visit to the school presented to them?); "when we see parents who are just 'here take my kid'" (parents, and this is particularly the case with many Mexican immigrant parents, trust the school with their child's schooling, they are not just handing him/her off).

I do not want to imply that teachers had deficit views about their students' families. The situation is more complex and we could see teachers going back and forth between discourses. For example, later in that same session Olivia said:

> Olivia: I think our parents truly want the best for our kids. I mean, for parent-teacher conferences, they do show up, I think they just don't know what to do. I have had parents telling me, "I can't help him with this work in third grade. I don't know this." They can't do the work. They weren't educated…. I think they are so overwhelmed with life and situations that happened, that they're not really, they don't have the tools…. I don't feel like they have the tools to help their child. It's not from lack of desire. They just don't know what to do. They're overwhelmed by everything else that happens in life, and sometimes we lose sight of that because we're so frustrated in the classroom, and we think, it they would just help him with his homework, if they just didn't help him read, but the reality is that we do what we can with what we have.

Of course there is a lot that we could question about Olivia's talk in this excerpt, such as her notion that parents do not have the tools. But we can also sense her not wanting to just dismiss the parents as uninterested in their children's education.

Although the teachers' talk about their students' families may be seen as "interesting but unrelated to mathematics education," I argue that whether teachers view parents as resources or as obstacles or as the reason for their students' behaviour and performance should be of concern to mathematics educators. As Jorgensen (Zevenbergen) (2010) writes, "the solution cannot be found in looking from a mathematical lens but must be much broader if increased access to mathematics education is to be a reality of the future" (p. 26). Her study is centred in an extremely disadvantaged context in a remote Aboriginal community; arguably it is a context that at many levels is quite different from the one in my work. However, the low-income Latino/a communities where my work is located are marginalised not only because of poverty but also in terms of language and culture, particularly in the current anti-immigration movement in my local context. I do believe that we need to get a better understanding of how teachers view their students' families and work towards moving away from deficit views to approaches that seek to understand parents' circumstances and experiences. The fact that teachers who have been teaching in schools with a large number of students of Mexican origin seemed unaware of the difference in the representation for the division algorithm in the two countries (Mexico and United States), points once again to a lack

of communication between home and school. Some of the teachers in our work feel comfortable trying to make connections to their students' home experiences in other subjects but not in mathematics:

> Penny: Some kids do come in knowing a lot because they maybe have worked at home with their family in building things or working on a car or anything at home where they've had like pre-measurement experiences.… But you know when I mostly bring it out is in reading or writing time. In math I haven't seen it come out as much but then again maybe I am not being more aware of trying to ask those kinds of questions; maybe it's just I am faulting on my part of not asking those kinds of questions in math, because I do do it in other areas. [Interview, September 2006]

Making connections to students' cultural and language backgrounds is a complex endeavour. In the first part of this paper I gave a glimpse of some of our work connecting home and school mathematics (for more on this see Civil, 2002; 2007). In this last section I return to the students focusing now on a different topic, the issue of how language policy in schools affects participation in the mathematics classroom.

Listening to students, again

Since 2000 bilingual education in the State where my research is located has been severely restricted. Furthermore, since 2006, English Language Learners (ELLs) are to receive 4 hours a day of English language instruction, raising serious concerns about their opportunities to learn other content areas and the segregation that this approach promotes. It is a clear example of subtractive schooling (Valenzuela, 1999), in which the culture and language backgrounds of ELLs are not used as resources but instead seen as a problem that needs to "fixed." Many of the teachers in our work have had to switch from bilingual, additive approaches to Structured English Immersion (SEI) programs, where by law all instruction is in English with occasional clarification in the students' home language. Teachers have shared their frustration at the language policy and some of them have commented on the effect it has on students' participation in the classroom. Matilde, a middle school teacher at a school where ELLs were segregated for most of the school day, shares her perceptions of these students when they are approaching the time in which they may be switched to a "regular" classroom:

> Matilde: I work only with ELL students … Our kids feel afraid to be in the regular classroom because they feel the other kids have the power. So, even if I have a very brilliant a kid, he goes to a nor- class, a regular classroom, and he is going to be one X student [meaning anonymous]. Because he is not going to be that brilliant because they're going to ask them questions in English so they don't know how to explain themselves and they're going to be quiet. So they're going to be, relegated to the back of the class. So they are afraid to go to a regular class. [TSG, March 12, 2009]

I have discussed elsewhere several issues related to a restrictive language policy and students' participation in the mathematics classroom (Civil, 2009; 2011; Planas & Civil, 2010). Thus here, what I will do is provide a summary of some findings from this research. As Clarkson (2009) points out, we need to be aware of the specificity of different multilingual contexts as, "there is a danger that a model for teaching that may be useful in one such context can be assumed to be applicable in all multilingual contexts" (p. 151). My context is essentially a bilingual English-Spanish one, in schools in predominantly Latino/a communities with a strong affiliation with the Spanish

language, with several teachers and school personnel being bilingual themselves. Thus it is not unusual to hear both English and Spanish in the school grounds, and for students to use Spanish in their small group discussions. The language of instruction, however, is English. This is the result of a language policy that cannot be separated from the political environment of anti-immigration in my local context (this is also the case in other countries, as I discuss in Civil, 2008; in press).

I will centre my observations on a study with a small group of 8 ELLs, 7 of which were recent immigrant students from Mexico (had arrived within two years prior to the study). They were in 7th grade (12 year-olds) and were with other ELLs for most of the day (except for one elective, in which they were mixed with non ELL students). Very likely due to the small size of the mathematics class, the atmosphere in the classroom was very relaxed and family-like; students knew each other well and there was a lot of teasing going on. The teacher was Spanish dominant herself but taught in English most of the time. Students were expected to write in English and there seemed to be an implicit expectation that they would communicate in English when talking to the whole group. Probably not surprisingly, when presenting in English, their verbal and non-verbal expressions were stilted and seemed tentative. Working in groups and then presenting a group's approach to the rest of the class was not the norm in this school. Thus, as we encouraged students to do this, we also gave them the freedom to use Spanish to explain their thinking when they so wished. Allowing for that to happen gave us access to very rich and lively mathematical discussions, which in turn gave us a window into their thinking about mathematics. We would have missed this, had they (and we) not been able to access their home language. I want to stress not only the cognitive aspect but also the affective one. By having access to their first language students could use humour (which is culturally situated) and metaphors when solving problems. Such is the case of Carlos in solving a probability problem that had two spinners, one split in fourths with Yellow, Green, Red and Blue; the other one split in thirds with Red, Green and Blue; one of the tasks involved finding the theoretical probability of getting a match. Carlos right away said 3 out of 12:

> Porque, mira, aquí no están hablando del yellow. … Nomás el yellow está de metiche ahí, porque, mire, nomás está... Sale green, red, and blue. Todo sale green, red, and blue, y el yellow también participa, pero haga de cuenta que el yellow no cuenta, pues. [*Because, look, here they are not talking about yellow…. Yellow is just a busybody here, because, look, it's just… We get* green, red, and blue*. In everything we get green, red, and blue, and yellow also participates, but just suppose yellow doesn't count*.]

Carlos' use of the word "metiche" (busybody) is a cultural referent, which combines both humour and metaphor. He knew that there were 12 possible outcomes, and only 3 of them were matches. His explanation combines mathematical talk with more of an everyday language by referring to Yellow as a "metiche."

Encouraging the use of the two languages also gave us a window on the different strengths that students bring, such as a student, Octavio, who enjoyed engaging in mathematical arguments but did not show that inclination till the use of Spanish with the whole class became more visible. When presenting with his group on a somewhat difficult probability problem where they had to determine whether a game was fair, he relied on another student to translate into English and write on the white board his explanation. When another student challenged their work, Octavio argued with him in

Spanish. Yet, later on as he tried to explain in English why he thought the game was fair, his explanation was much harder to follow. Was it because of the language or because of the mathematical content?

Our research shows similar findings to those of Clarkson (2006) and Planas and Setati (2009) on the reasons and situations in which students switch languages (e.g., perceived difficulty). We also conducted task-based interviews in which similar to Clarkson's study, we asked the students about their language use to solve problems. Besides the cognitive implications of this type of research, I want to emphasize the affective component. Although this classroom provided a safe environment in which students could use both languages to do mathematics, it was after all a case of segregation and the students were very aware of this. They knew that they were not in the "regular" classroom and several of them shared with me that they would have liked to be in an environment that was more English dominant and with non ELL peers (see Civil, 2011; Civil & Menéndez, 2011; Planas & Civil, 2010). Thus, I wonder, were we "right" in encouraging them to discuss mathematics in Spanish? Or was doing this contributing to their perception that they were not having enough opportunities to learn English? This raises many questions in my mind around the effect of language policy on students' language identity in the mathematics classroom (and in school in general).

Closing thoughts

Like Jorgensen (Zevenbergen) (2010) and Martin et al. (2010), I argue for the need to find other approaches to address the mathematics education of non-dominant students. As Martin et al. write,

> Rather than generating concern about studies that do not give priority to mathematics content, it may be more informative to understand why studies that have continued to do so have offered so little in the way of progress for students who remain the most underserved. Minimal progress for these students would seem to demand that we pursue *all* promising areas of inquiry informing us about how to help them experience mathematics in ways that allow them to change the conditions of their lives. (pp. 16-17)

One promising area of inquiry is one in which all interested parties really listen to each other and work on making "difference" a resource rather than an obstacle towards the teaching and learning of mathematics. We should examine how our values and beliefs about what counts as mathematics and who can learn it and how, support or interfere with the development of learning experiences that are culturally responsive to the students we have (we all bring values and beliefs, including students, parents, teachers, and university researchers). Teacher education programs need to engage teachers and preservice teachers in experiences with parents and children that allow them to examine the complexities of different perceptions and valorisations of knowledge as well as the role that multiple languages and language policies play in children's learning of mathematics. To pretend that the cultural, social, language, and political contexts of non-dominant students can be put aside when teaching mathematics is educationally irresponsible.

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