LANGUAGE POLICY AND THE TEACHING AND LEARNING OF MATHEMATICS

Marta Civil    Núria Planas

University of Arizona      Universitat Autònoma de Barcelona

In this paper we reflect on how language as a resource is orchestrated by students who are immersed in political contexts that see certain languages as a problem in the mathematics class. We work with students of Mexican origin –Tucson– and students from Latin American –Barcelona. The language policies in our two contexts share a message of privileging the language of instruction (English or Catalan) over other languages. We illustrate language behaviors that may be interpreted as an expression of the students’ agency. We finish by questioning whether students enjoy the same degree of agency in regard to language choice depending on the social context of reference.

Introduction

This paper addresses Themes 1 (student mathematics learning and experiences in multilingual classrooms) and 5 (reflections on the broader social, cultural and political issues in diverse language settings). It draws on data from two research studies in two contexts, Barcelona, Spain and Tucson, USA. Our focus is on students from Latin America attending school in Barcelona, and students of Mexican origin attending school in Tucson. We attempt to show that even in two different realities, there are students experiencing similar dilemmas.

In Tucson the language of schooling is English and in Barcelona it is Catalan. Our focus is on students whose home language is not the language of instruction. Although the language policies in the two contexts may not be the same, they share a message of privileging the language of instruction (English or Catalan) over other languages. We share a concern on the affective and cognitive impact of language policies that mark one language as more powerful than another, particularly when those implicated are from non-dominant communities (e.g., Mexican American students in Tucson, Latin American students in Barcelona).

In Arizona (Tucson), Proposition 203, which severely restricts bilingual education in the state, was passed in 2000. Stritikus and Garcia (2005) say, “the normative assumptions underlying Proposition 203 position the language and culture of students who are diverse in a subordinate and inferior role to English” (p. 734). Furthermore, language policies that are directed to immigrant students (as is the case in both contexts) are politically charged. As Wright (2005) writes in his analysis of Proposition 203:

"There is also collateral damage as the result of the political spectacle surrounding Proposition 203. The issue was promoted as proimmigrant and supposedly only dealt with the narrow issue of the language of classroom instruction. However, it sparked widespread debate about immigration …"
stirring up strong emotions about illegal immigrants and directed attacks on the Hispanic community in particular. (p. 690)

In the case of the autonomous region of Catalonia (Spain), Catalan is taught as a separate subject and it is the only official language of teaching and learning at all levels of the education system. Students whose home language is not Catalan learn this language at school in the so-called “special classes.” In Planas (2007), language is interpreted as a key feature of national and personal identity in the Catalanian context. This is highly related to the fact that Franco’s dictatorship attempted the suppression of Catalan identity by prohibiting the public use of Catalan and only allowing Spanish in schools. After Franco, the local autonomous government developed an educational policy with Catalan as the only language of instruction.

**Some considerations on multilingualism and mathematics education**

We outline some of the main ideas from the literature that have influenced our research. In particular we highlight two concepts that are key to our work: language as resource and language as political. Moschkovich (2007) argues for a sociocultural perspective that moves away from what bilingual learners cannot do and, “instead focuses on describing the resources bilingual students use to communicate mathematically” (Moschkovich, 2007, p. 90). Setati (2005) writes about the political role of language:

> Language is always political not only at the macro level of policy making but also at the micro level of classroom interactions… Decisions about which language to use, how to use it, and for what purpose are both pedagogic and political. (pp. 450-451)

In our work we look at the challenges and affordances of multiple languages in the classroom (although in our context we are focusing on two languages at a given time) in a political context that clearly privileges one language in the classroom. In the case of Tucson we focus on the richness of students’ mathematical thinking and their level of engagement with the task when using their home language. In the case of Barcelona we also point to the opportunities created by using the students’ home language. However, as we have written elsewhere (Civil, in press; Planas & Civil, in press), the situation is more complex than just letting students use Spanish either in Tucson or Barcelona.

In what follows we illustrate some episodes in our two contexts in which students use both their home language and the language of teaching during their learning of mathematics. This happens in Tucson and Barcelona, two places with a monolingual bias coming from the current language policies—“English only” and “Catalan only.” We finish with a reflection on how language as a resource is effectively orchestrated by students who are immersed in political contexts that see certain languages as a problem in the mathematics classroom.
The data below come from a classroom with only eight seventh graders (12 year-olds) all classified as English Language Learners (ELLs). Spanish was the home language for all the students, the teacher, and the researcher. Yet instruction took place in English and the materials were also in English. English language learners were segregated (i.e., in classrooms with other ELLs) for 5 or 6 of their 7 subjects. As Gándara and Orfield (2010) write, “as devastating to the educational outcomes as segregated schools are for minority and English learner students, perhaps even more pernicious is the internal segregation that goes on within schools” (p. 10) (see Civil, in press; Civil & Menéndez, 2011; Planas & Civil, in press, for more on this segregation from the point of view of the students and their parents). To a certain extent this segregation allowed us to develop an experimental situation in this classroom in that we were able to encourage the use of Spanish probably more so than if they had been in a class with non-ELL students. Although the written communication was in English, the oral communication in the classroom often had both languages. Probably not surprisingly, students switched to Spanish as soon as the conceptual level of the explanation they were giving increased. But here we want to emphasize other aspects of the use of the two languages in the classroom.

When communicating in English, verbal and non verbal expression often appeared tentative and stilted. When communicating in Spanish, we witnessed students engaging in lively mathematical discussions (even heated arguments) with each other and using humor and metaphors towards the solution of a task. The differences both at the affective and cognitive level were very noticeable with each language. We argue that we would have missed much of these students’ thinking if we had not had access to their using their home language. We illustrate some of these ideas with an example from a unit on probability. It relates to a problem, which showed two spinners, one split in fourths with each section a different color (red, green, blue, and yellow) and the second spinner split in thirds (red, green, and blue). This was a 2-people game where one person wins 1 point if after spinning the two spinners the colors match and the other person wins 1 point if the colors do not match (Lappan, Fey, Fitzgerald, Friel, & Phillips, 2006).

**Episode 1: Teasing about a tree diagram**

The first question in the problem was to make a tree diagram to show all the possible outcomes. Larissa draws a tree diagram on her sheet, while Carlos looks on. When she finishes, she very confidently says, “There it is, that is how you do it”, to which Carlos replies (smiling all along):

1. **Carlos**: Así. Ándale, ándale; así. Mira, así como lo tiene la Larissa, mira. Perfecto, mira. Fue algo perfecto. Verás. Esto lo tenemos que enseñar. Se merece que lo enseñemos esto. Es una belleza. (Showing it to the whole room.) Mira, así se ve un tree diagrama, vean; así. [Like that. There you go, there you go; like that. Look, it is just like Larissa has it; look. Perfect, look. It was something perfect. Let
me show you. We have to show this. It deserves to be shown. It is a beauty. (Showing it to the whole room.) Look, that is how a tree diagram looks, look; like this.

2. Larissa: Ya, alucín, ya. [OK, fool, enough.]

3. Carlos: Asi, asi, asi mero. [Like that, like that, just like that.]

To understand this interaction, we need to contextualize it. We had paired Larissa and Carlos since we started videotaping in February. This episode took place in April and by then they were used to working together. Their interactions were a combination of arguing, teasing each other, and borderline getting upset. Yet through these interactions they also contributed solid mathematical insights. We argue that students having access to their everyday talk in their home language, including humor, teasing, arguing contributed to the development of mathematical meaning. In the next episode, the students are working on finding the probability that there will be a match. Larissa and Vicente had come up with different answers and the first author, Marta, had asked them to talk about this. Carlos who is sitting with them is finishing his tree diagram and thus “technically” he is a little behind, yet all of a sudden he interjects in the dialogue between Larissa and Vicente.

Episode 2: “El yellow está de metiche”

[Larissa and Vicente are talking about the problem; Marta is listening to them; Carlos is working on his own, as if not being part of this conversation]

1. Vicente: Porque es red-red; red-blue; ah no, sí, son tres. [Because it’s red-red; red-blue; ah no, yes, it’s three.]

2. Carlos: Tres, tres de doce, Miss. [Three, three out of twelve, Miss.]

(Larissa points at Carlos and laughs; Marta smiles)


4. Carlos: Porque, mira, aquí no están hablando del yellow. [Because, look, here they are not talking about yellow.]

5. Marta: OK.

6. Carlos: 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 a la... Haga de cuenta que el yellow no cuenta, pues. [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 to the.... Just suppose yellow doesn’t count.]

7. Larissa: No es cierto. No es cierto. [That’s not true. That’s not true.]

8. Marta: No, no, me ha gustado. Me ha gustado “Está de metiche.” Eso me ha gustado mucho. [No, no, I like it. I like “It’s just a busybody here.” I like that a lot.]

9. Larissa: No, no. No, nomás porque aquí no hay yellow; por eso. [No, no. No, it’s just because there is no yellow here; that’s why.]
Carlos shows an understanding of the problem: he knows there are 12 outcomes and only 3 of those show a match, hence his saying 3 out of 12 (line 2). His explanation brings this image of yellow being a busybody, basically not having anything to do with the matching, but still playing a role (since yellow is part of the 12 outcomes) (line 6). Carlos brings in an everyday life concept (busybody) to support his mathematical argument. Though Larissa first disagrees with him, in line 9 she seems to indicate that she now sees his interpretation when she says “there is no yellow here.” Larissa had solved the problem by listing all the outcomes and seeing which ones showed a match, a more “typical” mathematical approach.

**Barcelona**

In the Barcelona school context, like in the case of Tucson, not a sufficient fluency in the majority language –Catalan– is commonly constructed as a deficit or disadvantage. Consequently, language diversity in classrooms is primarily viewed from a problem perspective. Nevertheless, during group work in mathematics classrooms, we have documented several episodes in which Latin American students contest this approach and take instead a resource perspective through “bilingual behaviors.” Despite the tacit norm around only using Catalan in written and verbal communication, we observed that when working in small groups, Latin American students often turned to Spanish, thus exhibiting bilingual behaviors. We illustrate this in the following episode, in which some students comment on a task concerning plane geometry.

**Episode 3. Discussing about triangles**

Four students aged thirteen are engaged in the resolution of a problem. Three of the students were born in Colombia and the other one in Peru. They all attend the regular mathematics classroom, after having been for at least one year in the special class to learn Catalan. Here we reproduce part of a conversation that takes place mostly in Spanish, but also contains a few sentences in Catalan (see the underlined) although these do not really refer to mathematical content.

1. **Raúl**: Los triángulos equiláteros siempre son isósceles. [*Equilateral triangles, they are always isosceles.*]

2. **Estefanía**: Sí, és veritat. Pero decir eso es una tontería. [*Yes, it’s true. But to say that, it is foolish.*]

3. **Eduardo**: Quina és la definició? Isósceles significa solo dos lados iguales, ¿no? [*What is the definition? Isosceles, it means only two equal sides, right?*]

4. **Raúl**: No me acuerdo. [*I don’t remember.*]
5. Nora: Son cosas distintas, por eso los nombres son distintos. Hay que ir a mirar si el equilátero es acutángulo, o rectángulo, o… [They are different things, that’s why names are different. We need to look whether the equilateral is acute, or right angle, or…].

6. Estefanía: Això volia dir. Ahora tenemos que combinar los lados y los ángulos para llegar a saber cuáles son los triángulos que existen. [That’s what I meant. Now we have to combine sides and angles to know which triangles exist.]

7. Raúl: Doncs això! [That’s it!]

Raúl, Estefanía, Eduardo and Nora draw on Spanish, their home language, to further discuss mathematical questions, and during group work use Catalan in a rather perfunctory way. This may be interpreted as an expression of these students’ agency. By using their home language, they may be expanding their opportunities to participate. One question that arises is whether the same students use their home language as a resource in more “public” spaces such as whole group work, where other non immigrant students and the teacher are present. Is these students’ agency strong enough to behave like bilinguals in all their contexts of learning? If so, can we infer similar results for the case of Tucson? In this case, they were in a classroom with all ELLs and sharing a common home language but what will happen in a different classroom arrangement?

**Final remarks**

While the perspectives on language as a resource and as a problem come from competing options, some of the students’ behaviors in Tucson and Barcelona show that these perspectives are not necessarily incompatible. It is therefore useful to distinguish between language policies and language behaviors in classrooms. Certainly, language policies have an impact on the ways students—and teachers—may respond to language diversity (this is argued in Setati & Planas, in press), but our data show that students still keep a degree of agency.

Our reflection does not attempt to reach generalizations. We know that many students’ behaviors in linguistically diverse mathematics classrooms are limited by monolingual language policies all around the world. Nevertheless, we point to the fact that some students find ways to overcome political constraints, although on some occasions this only happens in small group work. It is not clear whether these students are aware of being acting “against” the monolingual norm. We cannot say that they are consciously affirming their language identities, neither can we say that they are consciously separating the different contexts for their language practices. But in terms of their participation in the class, they come to use their home language as a resource.

Still far from generalizations, the same student can use one language as a resource in a particular social context of practice and interpret that language as a problem in a different social context, according to how language policies are perceived. This student may understand that s/he has no other choice but to use English/Catalan in the more public spheres of the classroom and the school context, in which...
transgressor language practices become more evident. Consequently, students may not enjoy the same degree of agency in regard to language choice depending on which is the social context of reference. If so, to what extent students differentiate the contexts of their language choice, and more important, to what extent do they know that they are not expected to use all their languages in some of these contexts? Is the students’ use of their home language in the mathematics classroom an expression of both agency and difficulties with the language of instruction or the mathematics? How are these experiences of agency and difficulties influenced by the students’ understanding of the language policies in Tucson and Barcelona?

Acknowledgements

The work presented here is part of the research agenda of CEMELA (Center for the Mathematics Education of Latinos/as), funded by the National Science Foundation –ESI 0424983. It is also part of Project “Estudio sobre el desarrollo de competencias discursivas en el aula de matemáticas”, funded by the Spanish Ministry of Science and Innovation, EDU2009-07113/EDUC. The views expressed here are those of the authors and do not necessarily reflect the views of the funding agencies.

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