

**SWIMMING AGAINST THE CURRENT:
MEXICAN AMERICAN PRE-SERVICE TEACHERS'
STRUGGLES TO PRIVILEGE SPANISH
IN AN AFTER-SCHOOL MATHEMATICS PROGRAM**

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CEMELA is a Center for Learning and Teaching supported by the National Science Foundation, grant number ESI-0424983.



SWIMMING AGAINST THE CURRENT...

...is part of my dissertation study which is concerned with investigating Mexican American pre-service teachers' use of language and background experiences when assisting 5th grade Latino students in mathematical activities in an after-school program.



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CEMELA

Center for the Mathematics Education of Latinos/as

<http://cemela.math.arizona.edu>

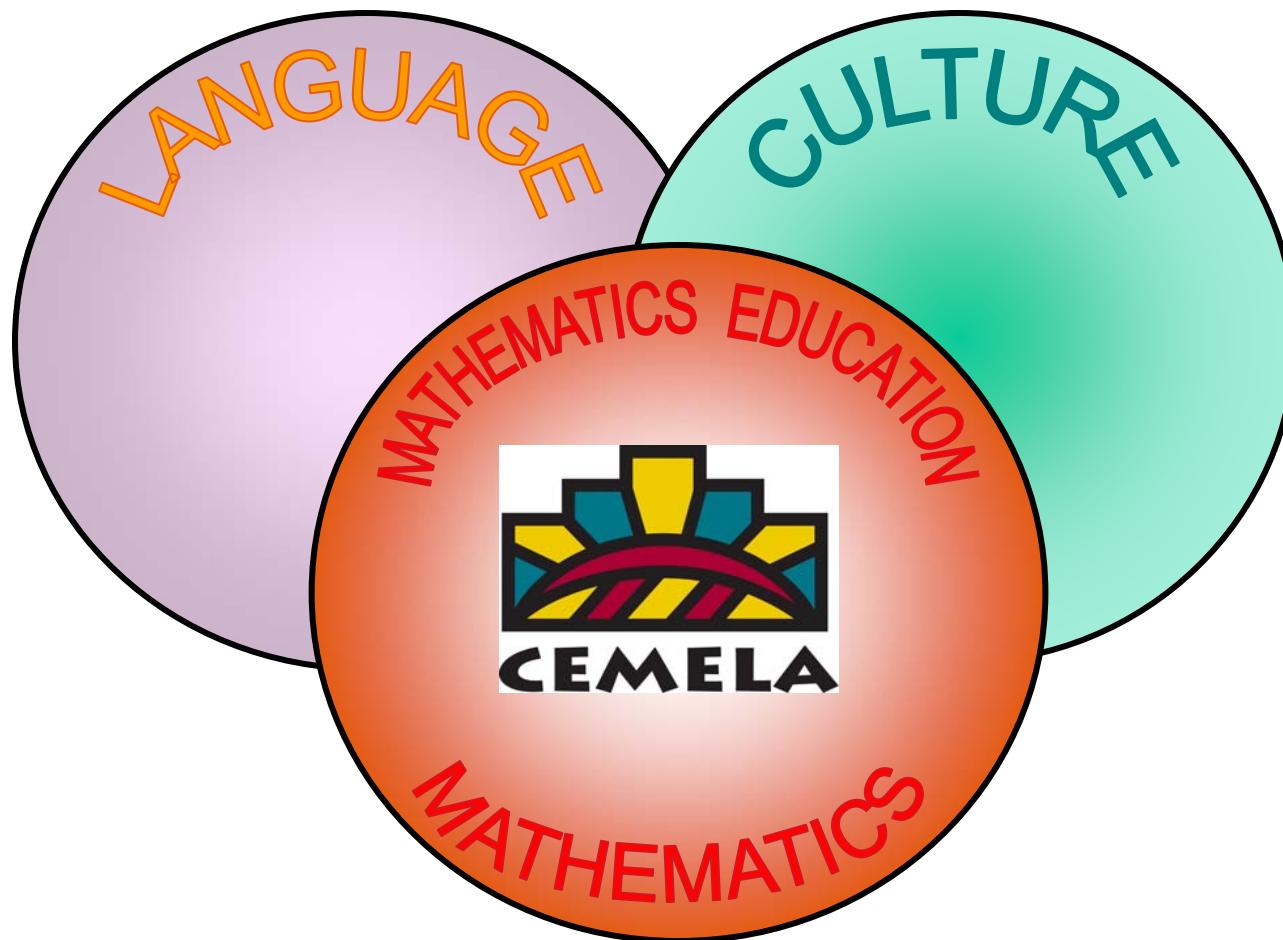
The University of Arizona
University of Illinois at Chicago
University of California, Santa Cruz
The University of New Mexico



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CEMELA'S INTEGRATED APPROACH



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Introduction

- The preparation of teachers for linguistically and culturally diverse populations has been the subject of a growing body of research and discussion over the last two decades (e.g. Brisk, 2008; Cochran-Smith, Feiman-Nemser, McIntyre, & Demers, 2008; Lucas, Villegas, & Freedson-Gonzalez, 2008)
- The focus is on white middle class English monolingual teachers and the disconnect between their and their students' backgrounds.



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Introduction

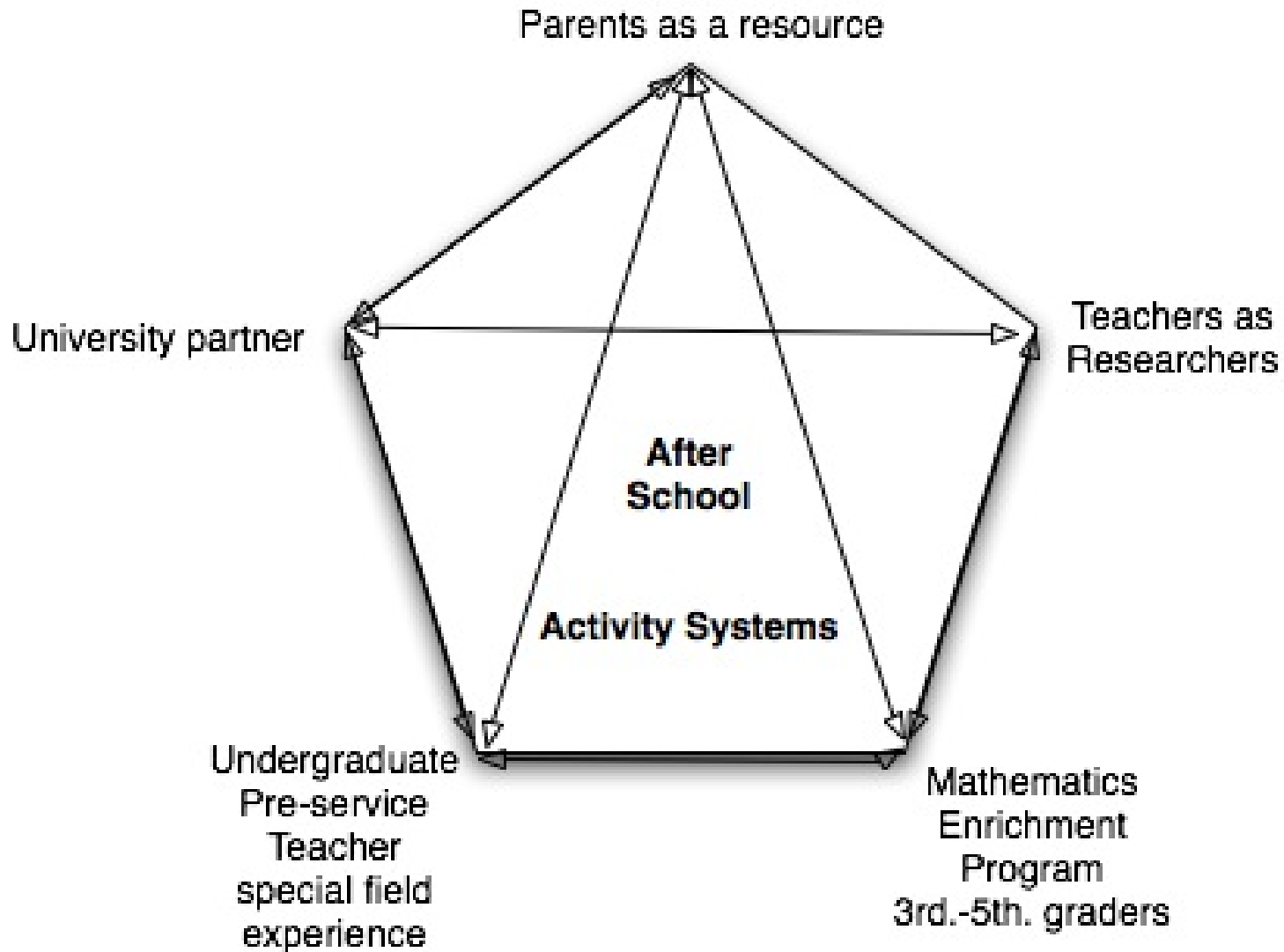
Some caveats...

- Bilingualism/multilingualism as the social norm (rather than the exception)
- Language, culture, and identity are intertwined and impact the academic and personal development of students (e.g. Clayton, Barnhardt, & Brisk, 2008)
- Students' home language(s) and culture(s) are resources that teachers can, and need to, build on to support students' learning of mathematics (e.g. Adler, 2001; Barwell, Barton, Setati, 2007; Civil, 2000; DeAvila, 1988; Gutstein et al., 1997; 2007; Kersaint, Thompson, & Petkova, 2008; Khisty & Chval, 2002; Khisty, 1995; Moschkovich, 2007; Setati, 2005; Stathopoulou & Kalabasis, 2007)
- Language is about power (e.g. Freire & Macedo, 1987) and discussions about language use in mathematics education must be examined within its sociopolitical context (e.g. Gutstein 2006, 2007; Setati, 2005)



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Los Rayos de CEMELA

- After-school mathematics enrichment program at an urban dual language elementary school in a predominantly Mexican American neighborhood.
- Los Rayos de CEMELA is a general adaptation of the Fifth Dimension after school projects (Cole, 1996) and also is guided by other similar projects including *La Clase Mágica* (Vasquez, 2003).
- Serves as a non-traditional field experience for bilingual Latina/o prospective teachers who work as mathematics facilitators.



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Los Rayos de CEMELA

- Bilingual Latina/o undergraduate students (UGs) meet twice a week with elementary students and engage in various mathematical activities.
- All activities are in both Spanish and English and include games, problems, and community based projects.
- UGs work in groups consisting of one UG and 2-4 students and are encouraged to do the mathematical activities with the students rather than playing the role of their teacher or tutor.
- At the end of each session students write to *el Maga*, a bilingual mathematics wizard.



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Los Rayos de CEMELA UG&Fellow weekly meetings

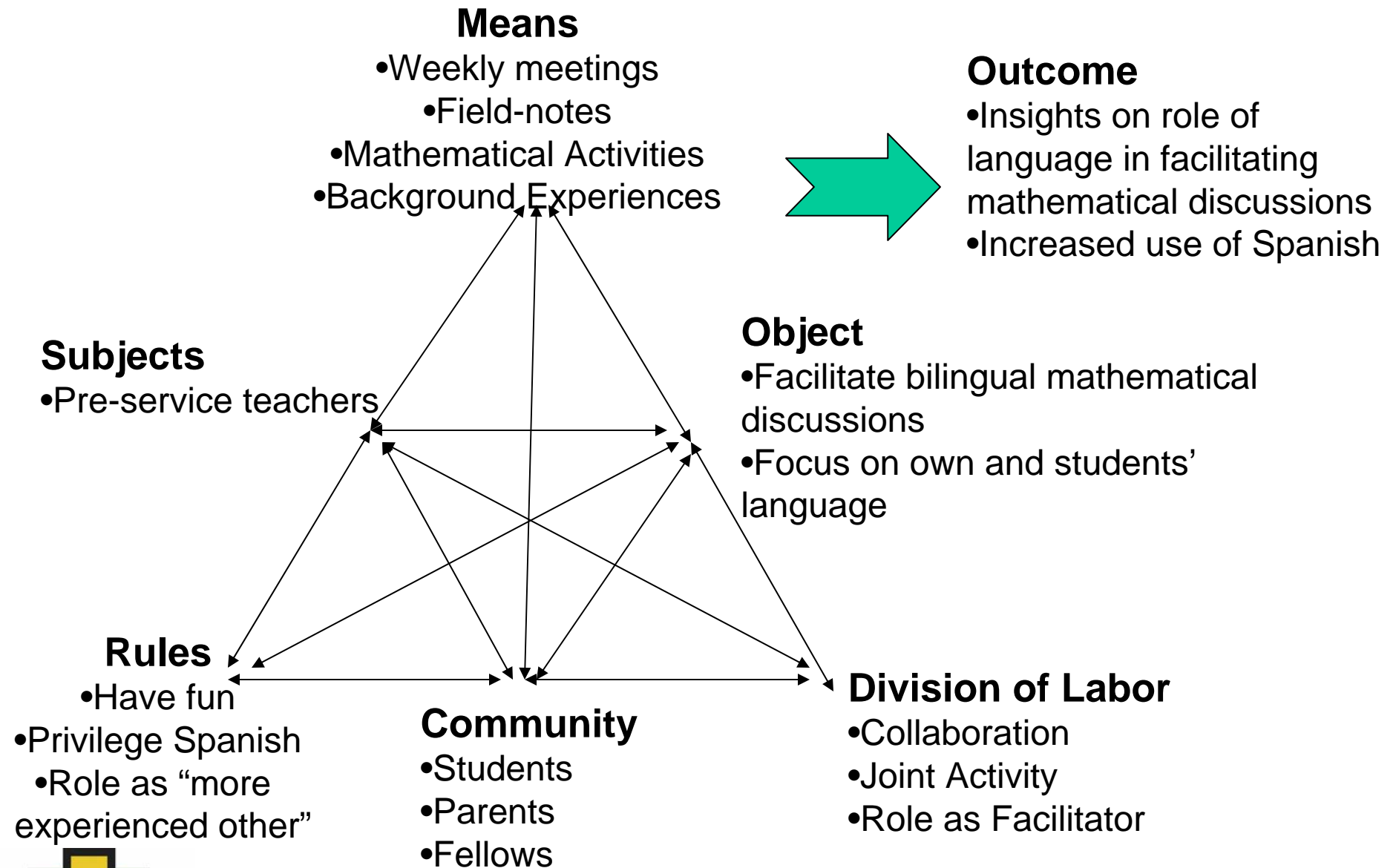
- * Discuss happenings of *Los Rayos* with a focus on UGs&childrens' use of natural language, childrens' mathematical strategies, UGs' assistance strategies, childrens' interests.
- * UGs reflect on their schooling experiences
- * Discuss *Los Rayos*' mathematical activities and possible ways of facilitating them.
- * Discussions are in English and Spanish.



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Activity triangle adapted from Engström (1987)



Theoretical Framework continued...

*Hybrid Spaces (Gutierrez, Baquedano-Lopez, Alvarez, & Chiu, 1999; Gutierrez, Baquedano-Lopez, & Tejeda, 1999).

- Spaces in between formal and informal contexts
- Emerge when a variety of resources become available
- Spaces where assumptions are challenged

When inner (historically accumulated) contradictions become conscious , they become the primary driving forces that bring change within and between activity systems (Cole & Engström, 1993; Roth, 2003)



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Participants

- * Grew up in Latino communities
- * Immigrant parents from Mexico
- * 1st language: Spanish
- * Interested in teaching inner city Latino students

<p style="text-align: center;"><u>Jose</u></p> <ul style="list-style-type: none">• Junior/elementary ed.• Born in Chicago• Pull-out-ESL	<p style="text-align: center;"><u>Juanita</u></p> <ul style="list-style-type: none">• Sophomore/elementary ed.• Born in Chicago• Transitional bilingual
<p style="text-align: center;"><u>Lupe</u></p> <ul style="list-style-type: none">• Sophomore/elementary ed.• Born in Mexico• Moved to Chicago at age 5• Maintenance bilingual	<p style="text-align: center;"><u>Maria</u></p> <ul style="list-style-type: none">• Sophomore/secondary math• Born in Chicago• Maintenance bilingual



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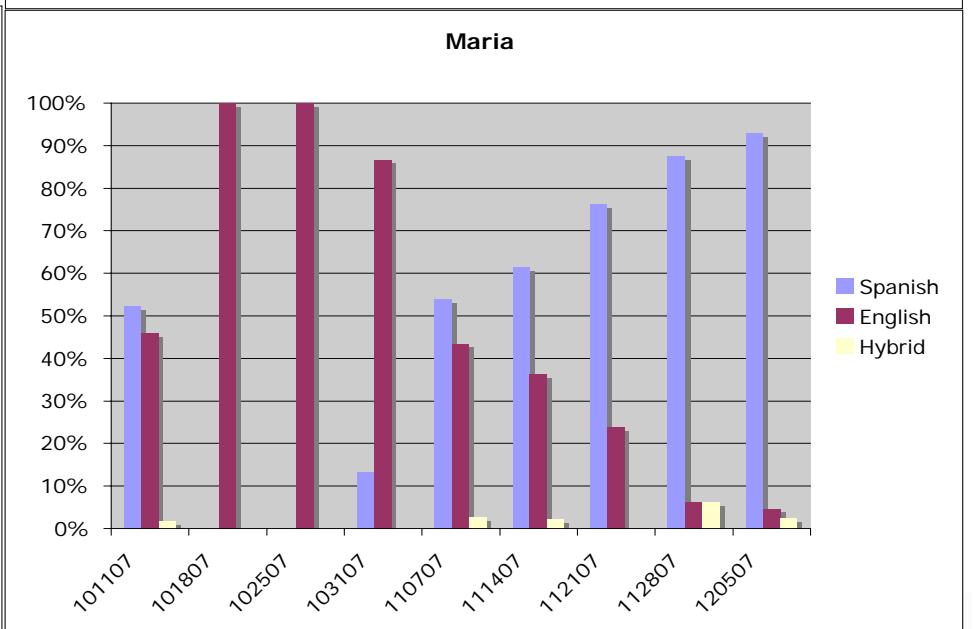
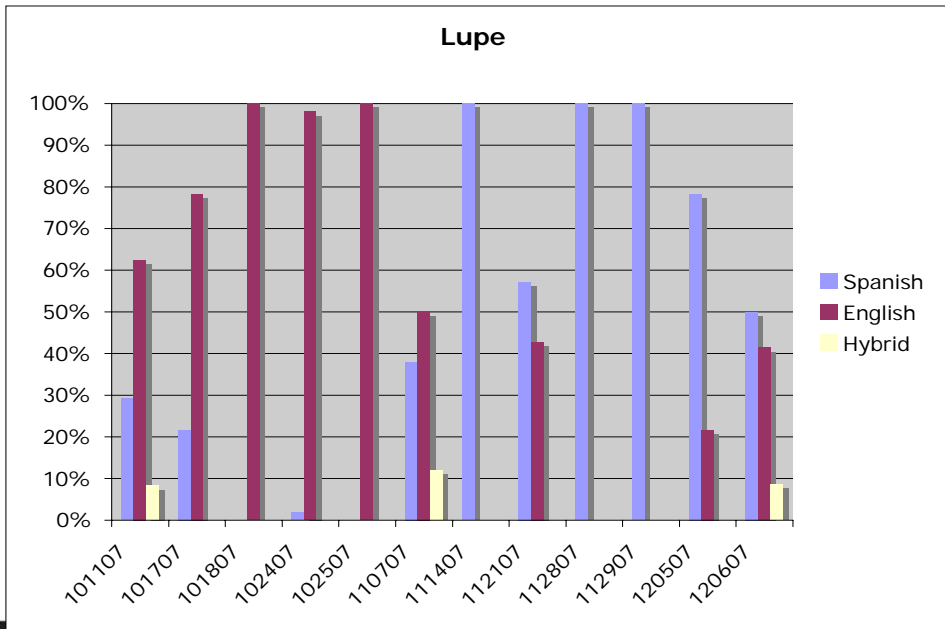
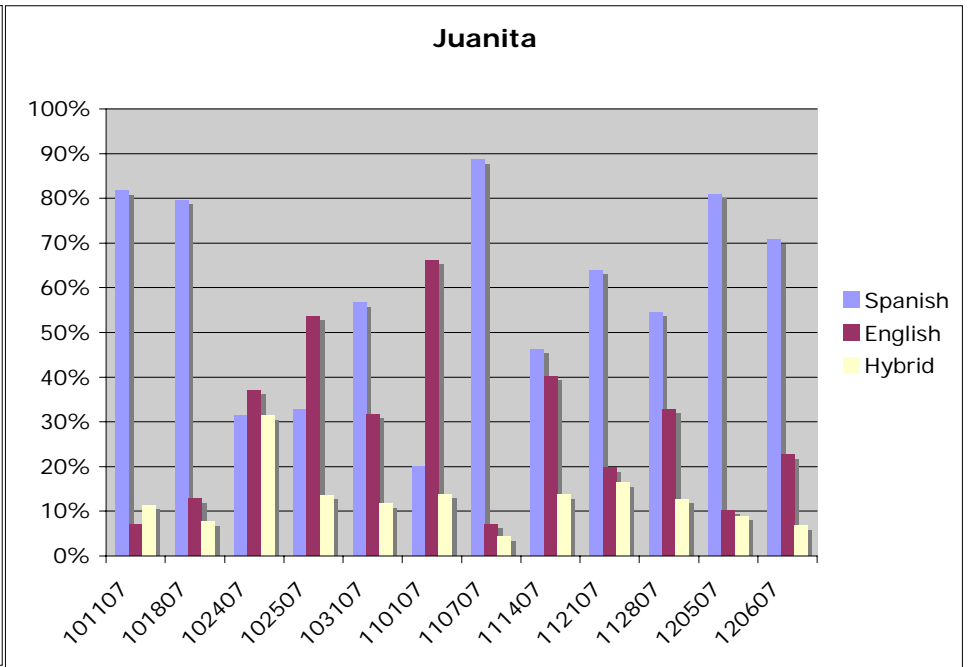
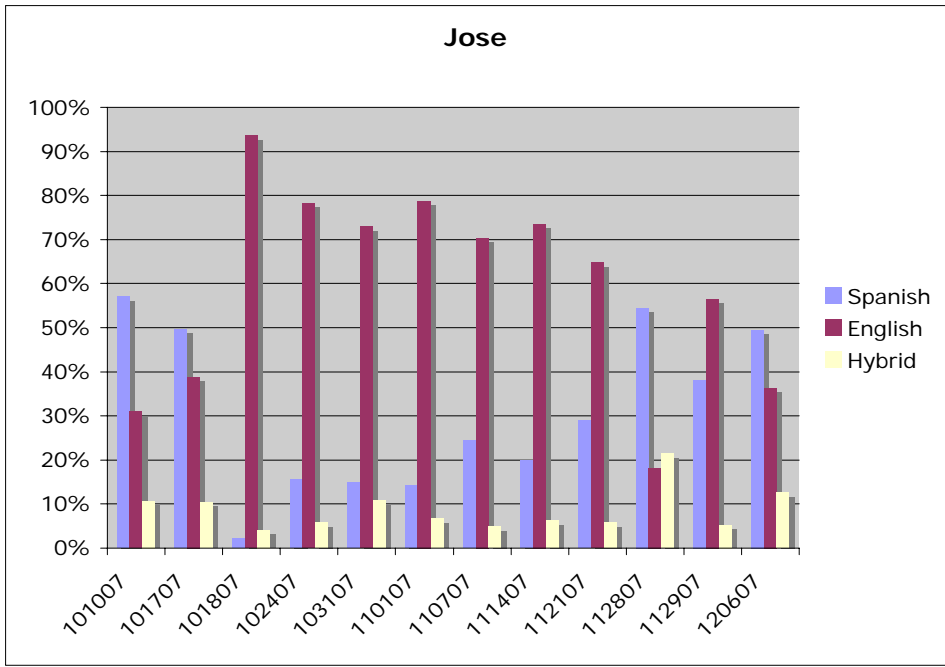


Methods

- Participants' interactions with 5th grade students in *Los Rayos* through a nine week period during Fall 2007. Twice a week for 1.5 hours/session. All sessions were videotaped.
- Participants' talk in a weekly a two hour debriefing seminar.
- Participants' and researchers' field-notes. All meetings (15 total) were video-taped.

- Qualitative methods (Lincoln & Guba, 1985), discourse and content analysis of participants' field-notes and oral comments during the weekly debriefing meetings.

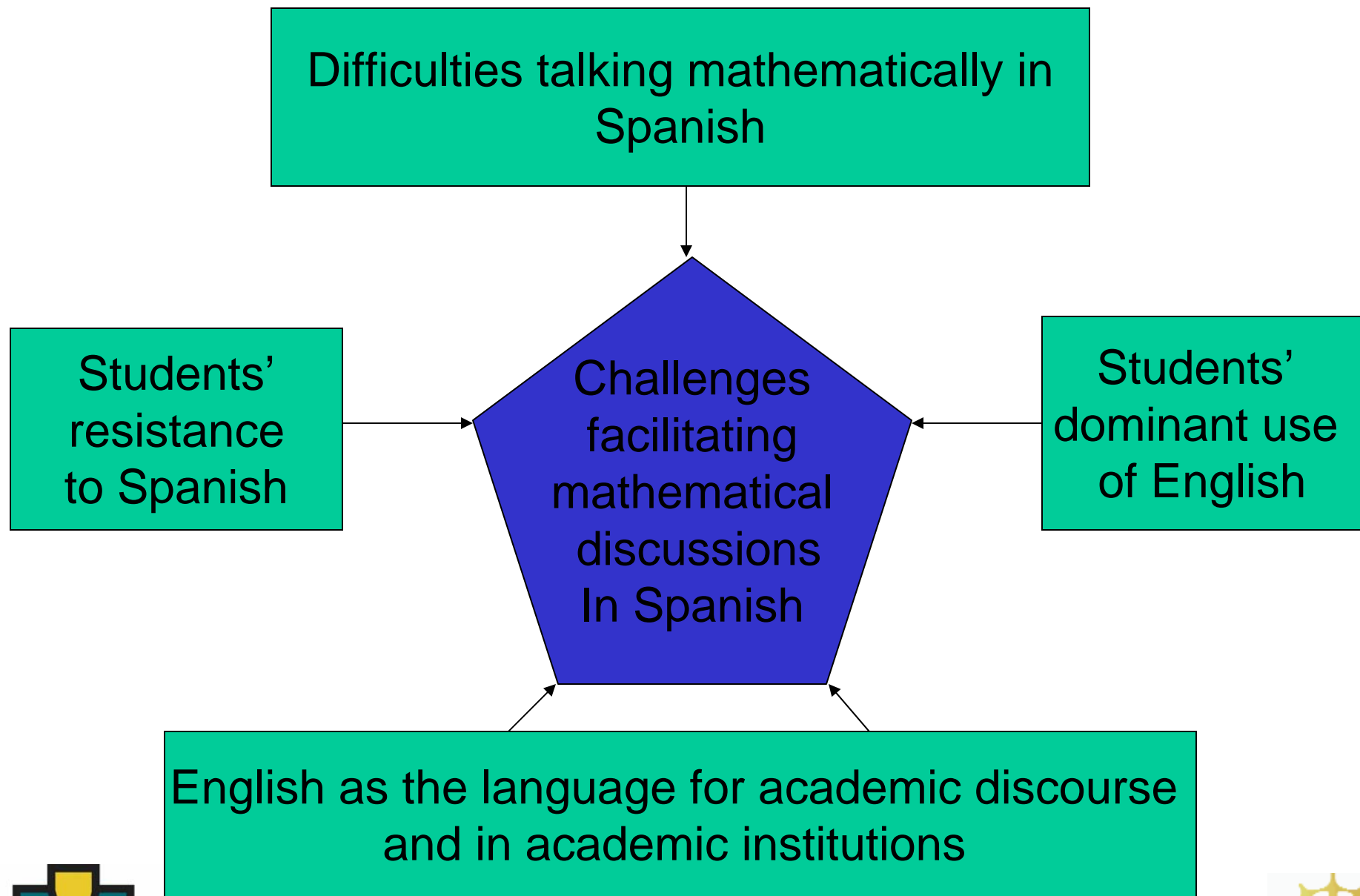




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Difficulties talking mathematically in Spanish

I always talk to them (the children) in English, when I realize it I try to switch to Spanish but then it just sounds weird and **A [it does not sound natural.] A** I always thought that Spanish was my dominant language, but I guess not.

A. Can you elaborate? It sounds as if I am trying too hard, and sometimes I do not use the right words. It's like I don't feel comfortable using Spanish when I do math. I don't know all the words and I can't explain it in Spanish.

...

Veronica told me in English that she did not understand, **B [I tried explaining the activity in Spanish but I was only confusing myself] B** so I started talking in English

B. Can you write more about this? I was not sure what mathematical terms to use in Spanish and that is why I switched to English.

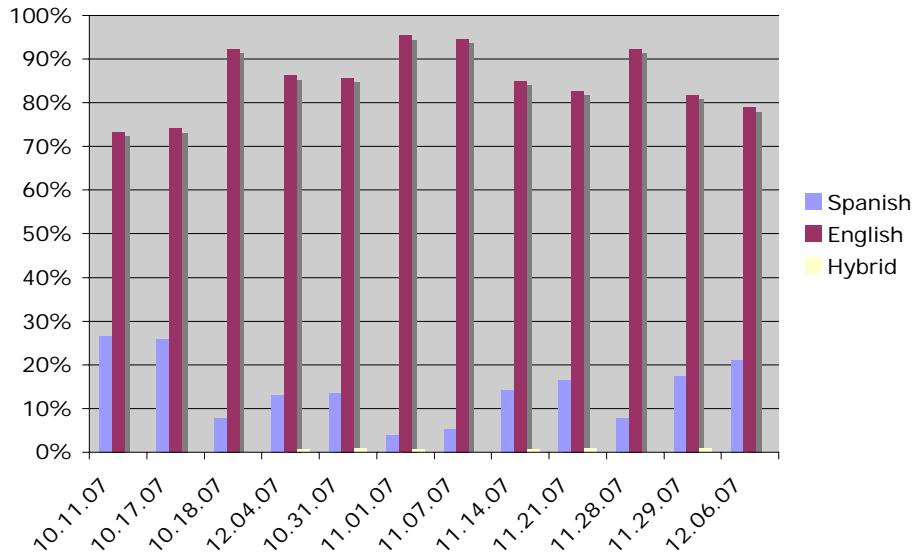
(11/01/07JZ)



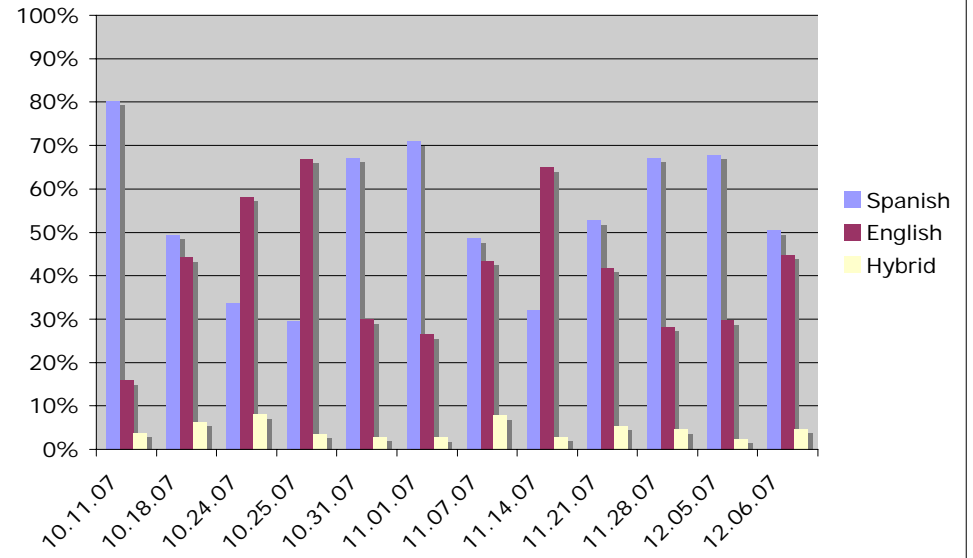
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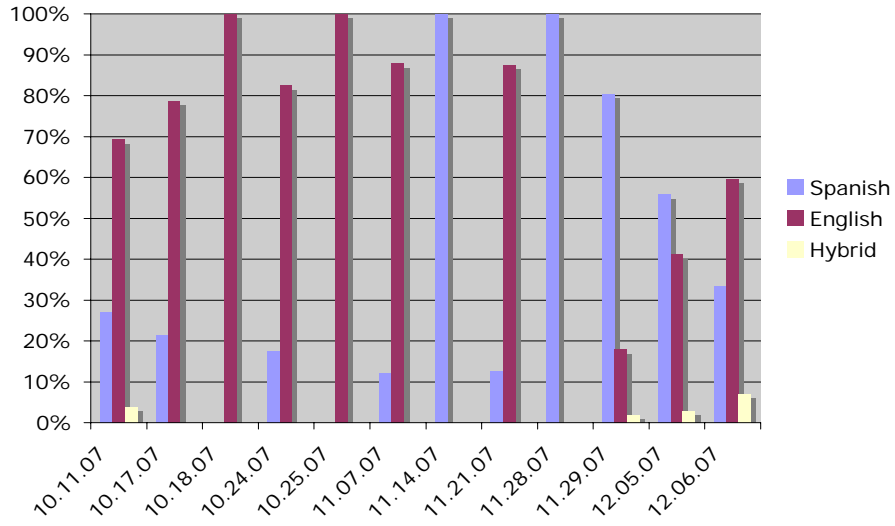
Jose's students



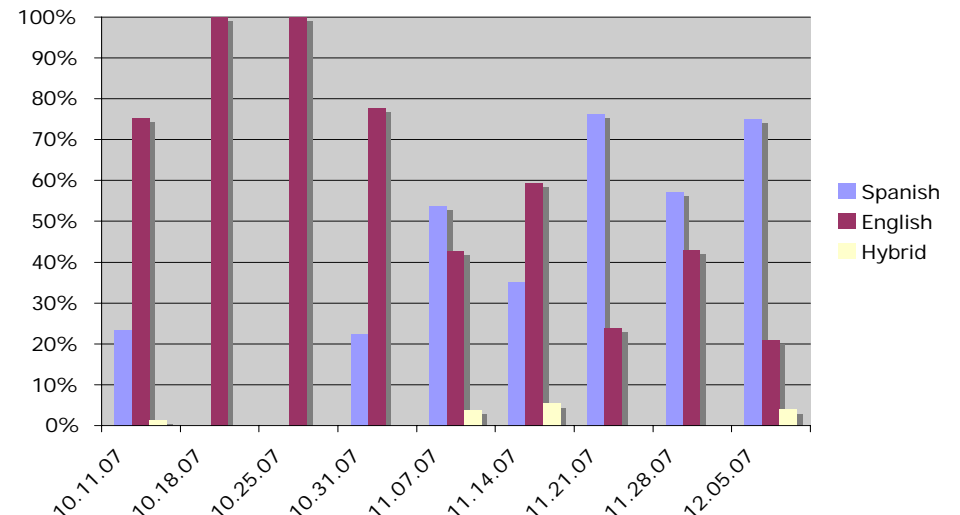
Juanita's students



Lupe's students



Maria's students



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Students' resistance

The kids' language was English even if I would talk to them in Spanish.

(10/31/07ML)

Throughout the meeting with the boys we mainly spoke English. Again I believe it has to do with the main students who shape the tone of the group which influence the English dominance. I began talking to them in Spanish but I mainly got most of my responses in English so I think that is why eventually I ended up speaking English. Even Ramiro spoke mainly English, which is funny because the first encounters I had with him he would mainly talk Spanish. I wonder if it's the others influence on him that just have gotten him used to talking in English.

(10/24/07JM)



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Students' resistance

I also tried to talk mostly in Spanish through the process of the activities but Mimi would scream at me “English Please!”

(10/11/07ML)

Today we had two boys who are English dominant they are Angel and Alfredo hence the dominant English speaking. Alfredo kept asking for English.

(11/01/07JM)



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Associating academic discourse/institutions as monolingual/English

Jose: It's like all our lives we have been trying to speak proper English in school and to sound academic and then we come here and we try to talk about math in Spanish and math is academic and it is very hard. Now it feels weird to use Spanish in here because this (math) is not something I am used to talking in Spanish but in English only. It's like I am not used to talking about things I learned in school in Spanish because we always used English and I always tried hard to sound proper and here (at the University) we have to sound academic and it is all in English.

(11/02/07UG)



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Associating academic discourse/institutions as monolingual/English

Juanita: Yea it's like we - all these years we had to to use English in school and now using Spanish is weird – I am not used to talking in Spanish in school – I mean when I'm in class. So this here (doing math in Spanish) is very different.

Lupe: I remember in 7th grade when the principal told us we couldn't speak Spanish any more and that it would all be in English and I remember that really hurt – I really remember that - and it was very hard but I guess after that I got used to it and now it feels weird talking in Spanish when I am in school because I got used to the English but when I was little I didn't want to use all English because it was hard for me and I would rather do it in Spanish. Whoa! It switched! I just thought of that now!

(11/02/07UG)



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Associating academic discourse/institutions as monolingual/English

Maria: I also had that thing about not talking in Spanish anymore in 6th grade and it was hard for me too. But eventually you get used to the fact that English is the language for school and Spanish for outside. For me like generally speaking I feel more comfortable speaking in Spanish but like when it comes to school it's like you know, you have to do this right, you have to speak in English, you know it's the language of America and they are teaching it in school so we grew up pressured to speak in English. But once we are outside and are free in the environment then we are more comfortable to speak however we want. But when I'm in class I can't speak Spanish so when I'm in school or when I go to the after-school - once I enter a building that is like I'm in grade school again so I automatically use English and I was not conscious of that until lately.



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(11/02/07UG)



Students' increased use of Spanish

Parents as experts

Nature of recipes project

Overcoming the challenges

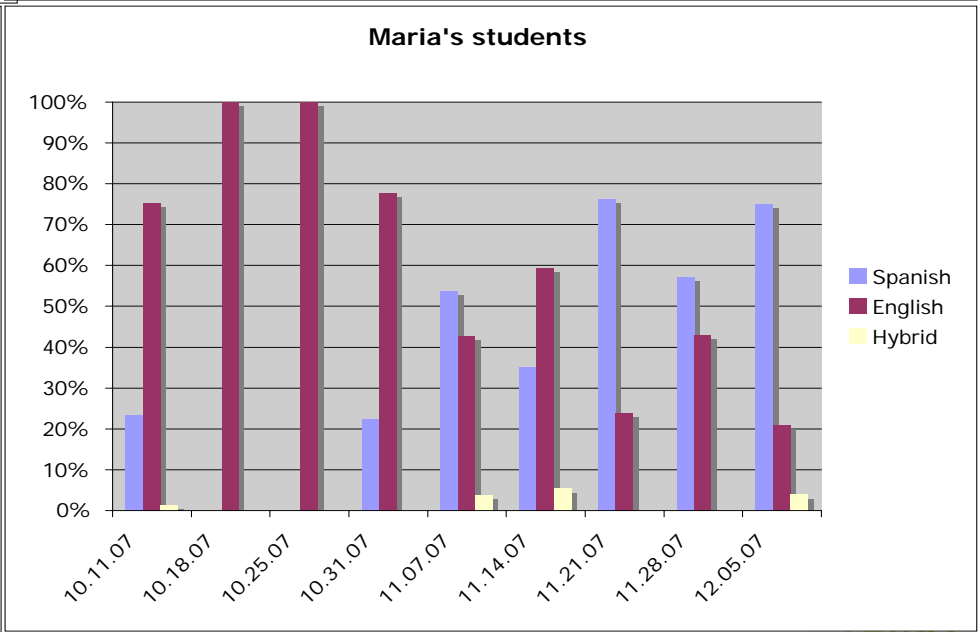
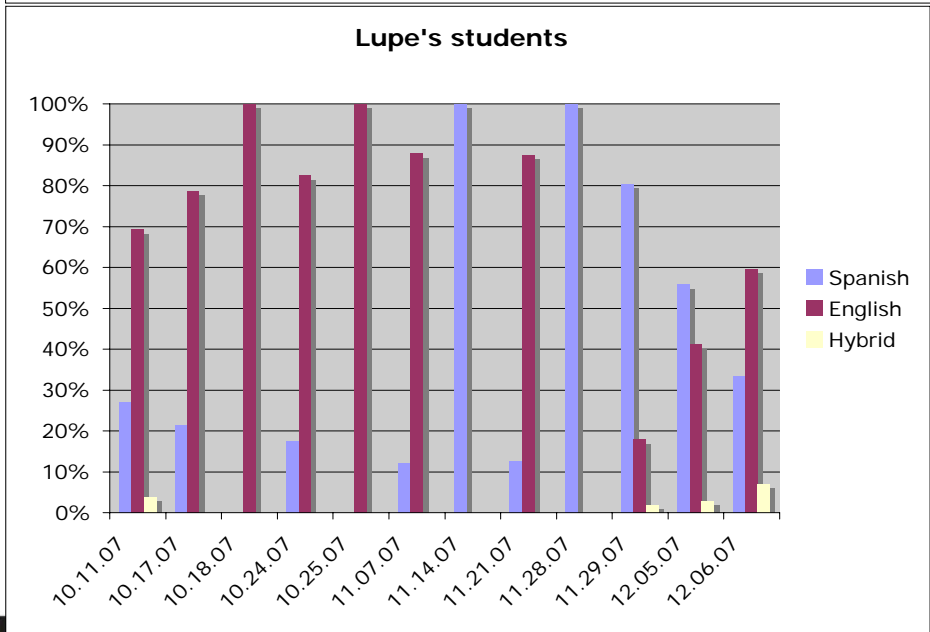
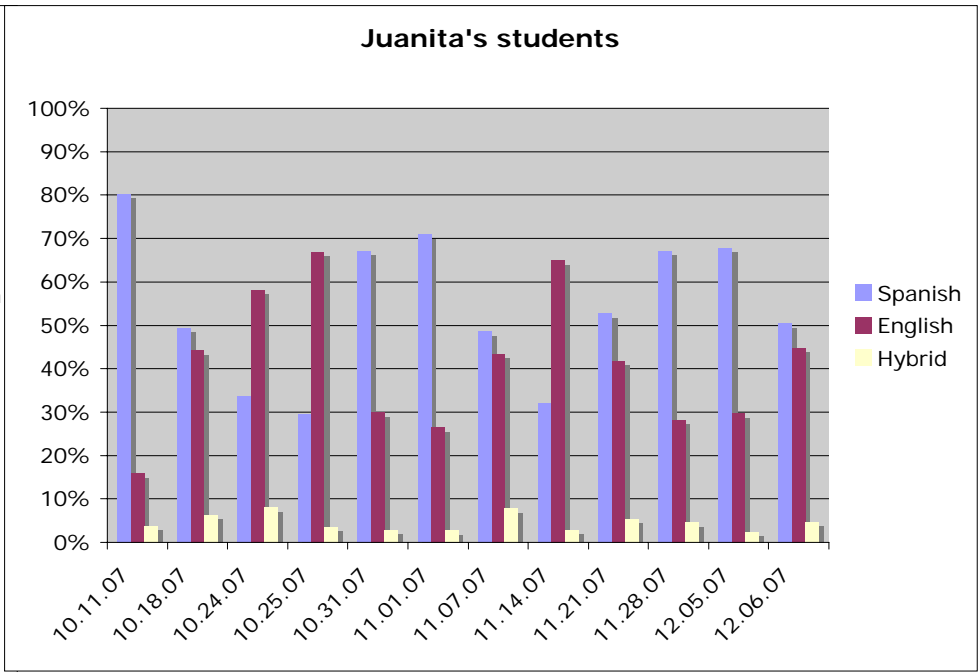
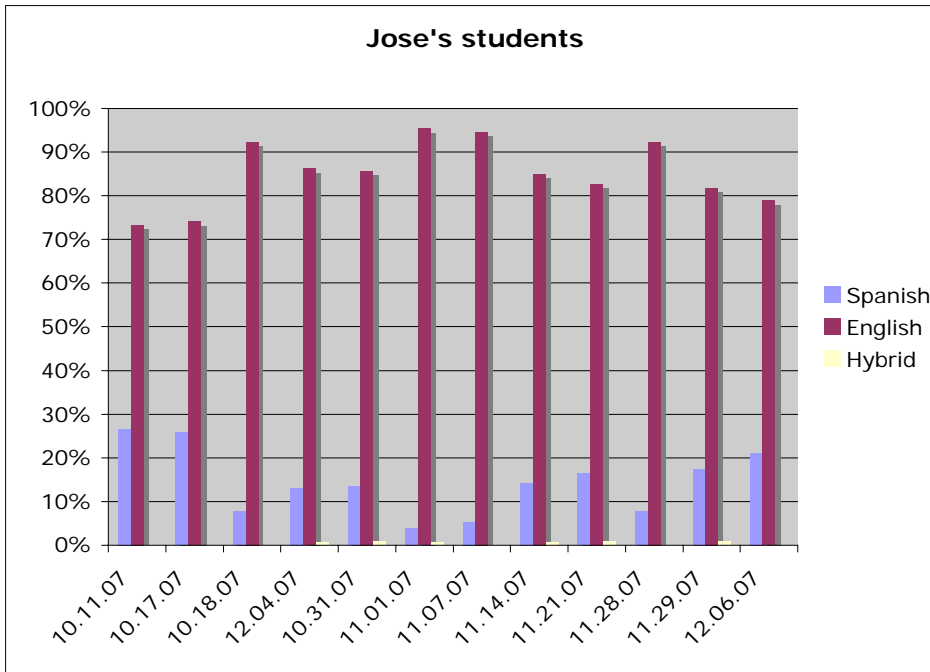
Support in developing Spanish mathematical discourse

Discussions during weekly meetings



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Students' increased use of Spanish

Jose: One of the students who surprised me the most was Alfredo. As I previously mentioned in my other encounters with him he is usually English dominant, but today I witnessed that he is able to express his ideas and mathematical concepts in English as well in Spanish.

(11/21/07JM)



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Parents as experts

Lupe: I think that when the mothers join us they will help us a lot because they have more experience in cooking and also they probably help their kids with math at home like homework so they have a better sense of how they think about math so they can help us a lot. Also I think they will help us all with the Spanish

Maria: Yea maybe they can ask questions to the kids and try to see how they think with the questions, because they have more experience. So I think they will help a lot.

All: (agree)

(11/16/07UG)



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Nature of recipes project

For me what was most surprising was that he was expressing his ideas well in Spanish, which is rare to see as I mentioned before that we mainly get English from him. I believe it has to do the fact that Alfredo brings lots of prior knowledge of how to make mole. Countless times has told us that he knows how to make it because he has made it with his grandmother, and mother. Since his family is Spanish dominant I'm sure he has practiced the process many times in Spanish which is why this type of environment in which he is familiar with sparked the Spanish language. I'm also sure that the mothers influenced not only Alfredo, but also the whole group since I'm sure most of the group addresses their parents principally in Spanish. I would also like to say that I think I mainly spoke Spanish because of the type of the environment I was in. It reminded me of Thanksgiving, Christmas, New Years, and any other special occasion which gathers every mother in my family, and in these gatherings everyone only speaks Spanish.

(11/21/07JM)



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Nature of recipes project

One big thing I noticed today overall was the fact that the students spoke most of the time today in Spanish. I think that it had to do with many things such as: being outside of the school environment and into the community. Andre's mother is known to speak mainly Spanish, which I believe influences the students to do also. The actual store being surrounded by other people from the neighborhood who spoke Spanish, and also being able to see signs of the store's products and prices in Spanish. Finally, I also believe their own prior knowledge of going to places like the supermarket or other places with family members encourages the use of their home language. I did not feel anyone have a hard time expressing ideas, and they did well in giving each other good insights on their thoughts as they made their choices.

(11/28/07JM)



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Support in developing Spanish mathematical discourse

I did notice myself speaking more Spanish because I did not get stuck with the mathematical terms and I knew what I was trying to say (in Spanish).

(11/07/07JZ)

Lupe: I think there's like things we know how to say in Spanish sometimes like before I didn't really know all the measurements in Spanish, well I did but I couldn't remember them, but now that we're like going over everything we discuss how we will talk about it with the kids in Spanish, now I can understand it better and I can explain things better in Spanish. Maybe my Spanish has improved because of CEMELA.

(11/08/07UG)



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Discussions during weekly meetings

For the first time I was conscious of my language. I noticed when I would switch from English to Spanish and from Spanish to English. I think that I'm more aware of my language because of all the conversations of language we've had during our meetings.

(11/07/07ML)

Lupe: I think that all these discussions we've been having here in Spanish have helped me like not feel weird anymore - I'm not sure how to put this - it's like before it felt weird talking in Spanish here in school especially when we were doing the activities but now I got used to it so I think this has made me feel more comfortable and maybe also this is why I use more Spanish with the kids.

(11/26/07UG)



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Discussions during weekly meetings

Jose: I agree and I think it is awesome that we have the opportunity to discuss everything in Spanish and in English like here at the University and like that we do the activities here with you guys and we are pushed by Carlos and Higinio to use Spanish and it's like I am more used to it now. Also when we talk about when we were little and we were in school and our experiences and all that I feel like I'm in a therapy session (laughs)

All: (laugh and nod)

Lupe: Yea me too it's like I needed that!



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(11/26/07UG)



Conclusion/Discussion

- *It is often taken for granted that if a teacher is Latina/o and is fluent in both Spanish and English (s)he will be able to facilitate mathematical discussions in both languages with ease.
- *Many teachers with similar linguistic and cultural backgrounds with their students have experienced “subtractive schooling” (Velezuela, 1999) and need support in utilizing their resources in their teaching.



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Current/Future Explorations

- *What kinds of experiences would help prospective teachers develop appropriate understandings and skills for integrating students' home language and mathematics?
- *How can teacher education programs provide Latina/o (prospective) teachers with the appropriate linguistic and cultural support to mediate their development as culturally responsive mathematics teachers?
- *How can hybrid and out-of-school mathematics learning contexts facilitate the development of mathematics teachers? Specifically: What can teachers learn about bilingual students' mathematical practices through interacting and/or observing them in a particular after-school mathematics context and how can inquiry on students' language, culture, and discourse practices in this setting inform their teaching of mathematics?



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Questions?
Comments?



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