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Linguistic Hegemony and Counterhegemonic Discourse in the Borderlands

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Hegemonic Language Practices in Engineering Design
and Dual Language Education

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Abstract

With the goal of achieving bilingualism and biculturalism, dual language education (DL) has a social justice orientation. As the program option with the best track record of closing the achievement gap between Latinx and White students, DL programs can potentially create environments in which learners can develop knowledge of science, technology, engineering and mathematics (STEM) in two languages. In this article, we present findings from a two-year ethnographic study of engineering design curriculum in a K-5 DL program on the U.S.-Mexico border. Our team researched the implementation of a hands-on, highly interactive, inquiry-based STEM curriculum because immigrant emergent bilinguals from border communities are sometimes excluded from these learning opportunities. During the first year of implementation, the STEM curriculum was not taught following DL goals. Essential principles of DL education, including the use of two languages for instruction and equal status for both languages, were not followed. Lack of familiarity with the STEM curriculum and emerging expertise of engineering design explained this decision partially. Due to a dearth of resources, training, and expertise in engineering and in inquiry-based learning, the implementation failed to meet its counterhegemonic potential. In fact, it may have reproduced hegemonic practices that marginalized emergent bilingual Latinx students.

Introduction

This article discusses findings from a two-year ethnographic study of engineering design curriculum in a K-5 dual language program on the U.S.-Mexico border. Efforts to address the issue of Latinx[1] underrepresentation in engineering have focused on the development of enriching, inquiry-based curricula starting as early as the elementary grades. Unfortunately, Latinxs who are English learners (hereafter referred to as emergent bilingual Latinx) are, at times, excluded from participating in these experiences. Concurrently, a growing program option for emergent bilinguals is dual language (DL) education, the program option with the best track record of closing the achievement gap between Latinx and White students. However, seldom do we find Latinx students who are enrolled in DL and, at the same time, are pursuing enriching STEM experiences both in the current research literature and program implementation.

During two years of fieldwork at Ramos Elementary school, the research team documented linguistic practices that reproduce and counter the hegemony of English. For this article we focus on the first year of the implementation in order to illustrate the multiple contextual factors that construct hegemonic ideologies and practices—and that could potentially counter these ideologies and practices. The first year, the engineering design curriculum was taught in English only, despite the fact that Latinx students participants of the study were all enrolled in a DL program. Namely, essential principles of DL education were not followed: Only one language was used for instruction or assessment. The languages were not granted equal status during Engineering Design enrichment experiences created for the majority of Latinx students. We argue that factors such as lack of familiarity with the curriculum and emerging expertise of engineering design explained this decision partially. We further argue that "commonsense" understandings that normalize English in some contexts (science and engineering) also account for the practices described here.

Documenting the implementation of an enrichment STEM program for a majority of Latinx and ELLs in the context of the DL program would appear to be in itself counterhegemonic. However, we observed the first year that because of the dearth of resources, training, and expertise in a new content area (engineering), the experience failed its potential as counterhegemonic. In fact, in many ways, it reproduced the hegemonic practices of excluding

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[1] We use the term "Latinx" as a gender-neutral inclusive term alternative to Latino, Latina or Latin@ for people who self-identify as having roots in Latin America, South America, Mexico, and the Caribbean.

Latinxs and ELLs from enrichment programs. Through this study, we seek to illustrate the dynamic realities of hegemonic and counterhegemonic practices and discourses, and the important roles of teachers and students in these social practices.

Theoretical Framework

We draw from work in bilingual and dual language classrooms that explores the hegemonic and counterhegemonic discourses and practices around languages, with a particular emphasis on the relationship between English and Spanish. We draw on the literature on the hegemony of English (Shannon, 1995; Macedo, Dendrino,s & Gounari, 2003), as well as linguistic racism (Hill, 2008) or "linguicism" (Skutnabb-Kangas, 1988; Phillipson, 1988).

Language Ideologies in the U.S.: Linguistic Hegemony and its Material Consequences

Hegemony as conceptualized by Gramsci (1971), refers to intellectual and moral leadership (or dominance) of one group over others; moreover, it entails also the consent of those oppressed mainly through persuasion practices by the dominant group, including the dissemination of ideologies and discourses through media and institutions (i.e., schools) that legitimate the leadership of the dominant group. For our research project, schools, their policies and practices become part of the apparatus of persuasion, as well as tools for the manufacturing of consent to domination. This construct offers a way to understand the power relations between dominant or leading groups and subordinated groups.

> Linguistic hegemony is achieved when dominant groups create a consensus by convincing others to accept their language norms and usage as standard or paradigmatic. Hegemony is ensured when they can convince those who fail to meet those standards to view their failure as being the result of the inadequacy of their own language. (Wiley, 2000, p. 113)

As stated by Suarez (2002), the paradox "of linguistic hegemony is that one must 'buy into it' or acquiesce on some level in order to resist it" (p. 515).

The concept of linguistic hegemony refers to the relationships of power between majority and minority languages and the social groups that use these languages. It also refers to the consent of linguistic minorities who accept the dominance of the majority language and the subjugation of their own language.

> Wherever more than one language or language variety exists together, their status in relation to one another is often asymmetric. In those cases one will be perceived as superior, desirable, and necessary, whereas the other will be seen as inferior, undesirable, and extraneous. (Shannon, 1995, p. 176)

Even if this is not the case in every situation where languages coexist, we find this assertion true in most cases. Linguistic hegemony is non-coercive because linguistic ideologies, policies and practices legitimate the hegemony of the dominant language, in this case English. The media, government agencies, and educational institutions "launch periodic assaults on languages other than English" (Macedo et al., 2003, p. 23). Since language ideologies supporting the sole use of the dominant language are internalized by speakers of other languages, the hegemony of English legitimates its power and schools play a major role in this process (Bourdieu, 1991).

Language ideologies are the ways in which a community understands, both the value and role of particular languages or language varieties for their everyday practices (Kroskrity, 2000; Woolard, 1998). These positions about language "represent themselves as forms of common sense, that rationalize and justify the forms and functions of text and talk" (Hill, 2008, p. 34). In addition, language ideologies include the beliefs about speakers of particular languages, the ideas about who speaks "correctly" and who does not, and the beliefs about how language works (Lippi Green, 1997). These ideas and beliefs infiltrate educational policies and everyday practices in schools. In the U.S., the English language symbolizes national identity and schools are a way to target speakers of other languages and force English instruction on them. In the U.S., "the dominant ideology perpetuates and sustains linguistic, cultural, and racial discrimination by ignoring the linguistic and cultural diversity of the students in schools today" (Borden, 2014, p. 229). The valorization of English over other languages enhances the opportunities for some students restricting access and opportunities to speakers of languages other than English. Institutions such as school tend to reproduce the dominant language ideologies found in society,

which are in turn intimately related to everyday practices in this institution. Thus, language education policies are authoritative ways of producing de facto language practices in educational institutions (Shohamy, 2006).

Bourdieu's ideas about habitus and linguistic market are useful to explain this process. For Bourdieu (1990), utterances are a product of the relationship between a *linguistic habitus,* "the system of structured, structuring dispositions which is constituted in practice" (p. 52), and a *linguistic market.* The habitus refers to "a system of dispositions with a historical dimension, through which novices acquire competence by entering activities through which they develop a series of expectations about the world and about ways of being in it" (Duranti, 1997, p. 44). A monolingual habitus (Gogolin, 2002) or monolingual mindset (Piller, 2015) perpetuated by school systems would seem to explain how multilingual societies would privilege monolingualism through everyday classroom practices.

The linguistic habitus shared in a community is reproduced through everyday speech acts that are organized by educational institutions, designed to maintain the system. For example, in the linguistic market of the U.S., speakers are expected to use particular forms of English that are valued and accepted as the "standard." Thus, the English variety used in the school is viewed as the linguistic norm, the "standard," and the "correct language" (Achugar, 2008; Hill, 2008), while Spanish and border Spanish-English varieties are viewed as illegitimate and subject to criticism, invisibility, erasure and racist taunts, as in the case of deficit views of "semi-lingualism" (Zentella, 1997) and the use of "mock Spanish" (Hill, 2008) as a white practice of privilege. Not only do bilinguals in the borderlands "hear the anglos' incessant clamoring so that we forget our language" (Anzaldúa, 1987/2007, p. 84), but we also hear the clamoring of speakers of Spanish "standard" varieties who stigmatize the everyday language mixing practices and other border English and Spanish language features. "The message is clear: Latinas/os, especially poor youth or black immigrants, enjoy little linguistic capital whether they speak Spanish or English, and mixing languages is particularly devalued" (Zentella, 2007, p. 26). In bilingual programs, particularly TBE programs, researchers find that Spanish is defined as a language to overcome (Palmer, 2011). Linguistic insecurity[2] (Zentella, 2007), is the legacy of these subtractive policies.

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[2] According to Zentella (2007), linguistic inferiority is considering one's own language variety inferior to others (p. 28)

Language ideologies are closely related to identities and, in the linguistic market of the U.S., Latinx many times are defined as outsiders (Santa Ana, 2002; Urciuoli, 1996). And the term bilingual is "used by the dominant hegemonic forces not to mean the ability to speak two languages, but rather to typecast ethnicity as a form of devaluation" (Macedo et al., 2003, p. 9). Vélez-Ibañez (2017) similarly discusses the English Only movement as one of various forms of "anti-Mexican behavior" throughout history in the Southwest, along with anti-immigration, and racialism (p. 193). Discourses about Latinx are intimately related to their use of language. Like racism, linguicism produces and reproduces a hierarchy of dominance. Skutnabb-Kangas (1988) defined linguicism as "the ideologies, structures, and practices which are used to legitimate, effectuate, regulate, and reproduce an unequal division of power and resources (both material and immaterial) between groups which are defined on the basis of language (p. 13). Thus, many schools are contexts in which language "whiteness" and the hegemony of English are reproduced.

Ideologies have clear material consequences in everyday practices. As Anzaldúa (1987/2007) states, "if you want to really hurt me, talk badly about my language. Ethnic identity is twin skin to linguistic identity—I am my language" (p. 81). Clear examples of the material consequences of the hegemony of English can be seen in English Only and anti-bilingual education legislation in Arizona, Massachusetts, and (formerly) California. However, the hegemony of English is also present in bilingual programs, and even in DL programs, as will be developed in the following sections. Furthermore, hegemonic views of language also tend to define languages as bounded systems, such as the "monolingual view of bilingualism" (García, 2009; Grosjean, 2012). In bilingual and DL programs, these hegemonies of language are still organizing instructional practices.

Finally, the U.S.-Mexico borderlands, the setting for this study, has been called a place in which sometimes conflicting ideologies meet. For instance, Achugar (2008) argues that,

> the multiplicity of language ideologies that coexist in this particular community reveal the tension between the homogenizing forces of the paradigm of linguistic nationalism and the heterogenizing forces of the heteroglossic/border paradigm…Spanish in this context does not mean one language, but rather, it implies bilingualism or the expansion of the linguistics repertoire. (p. 15)

Similarly, Suarez, (2002) asserts that "resistance is not through monolingualism in the minority language, but rather through bilingualism" (p. 515).

Contesting Hegemonic Views of Language

Speakers in the U.S. have the choice of selecting English in an effort to portray a linguistic habitus that is valued in their particular linguistic market, or they may resist this linguistic habitus in their everyday speech acts, by selecting another language (i.e. Spanish) or a local variety (border English/Spanish). Researchers have documented numerous ways in which speakers' counterhegemonic ideologies and practices in and out of schools. Zentella's (1997) ethnography of the multiple and diverse ways of Puerto Rican children using languages in New York, including "Spanglish," Gutiérrez, Baquedano-Lopez, and González (1999) work on hybrid language practices in the Third Space, the multiple projects on funds of knowledge (Moll, Amanti, Neff, & González, 1992), and Mendoza-Denton's (1999) ethnography of subversive speech and semiotic representations of Chicanas, are foundational examples of ethnographic work that documents counterhegemonic practices. More recent research is presented in the following section.

Linguistic Hegemony in DL Settings

Linguistic diversity is an established feature of the makeup of lives in borderland institutional contexts. In legal, medical, mass media and retail, residents of the border participate in bilingual exchanges, which mean they negotiate how, when and with whom to use their multilingual repertoires. In schools, multiple languages are fluidly used in offices and playgrounds. In contrast, norms of how to use linguistic repertoires seem to be much more rigid in classrooms.

Even in the midst of great linguistic diversity a monolingual habitus or mindset has traditionally promoted the eradication of diversity through hegemonic language practices. Even in bilingual programs, monoglossic perspectives seek to promote monolingualism (García, 2009). Monoglossic or monolingual mindsets correspond to a perspective toward linguistic diversity that aims "to instill linguistic insecurity, to discriminate linguistically, to channel children in ways that have an integral linguistic component, while appearing open and fair to all" (Hymes, 1996, p. 84). Thus, instead of promoting dialectal and linguistic diversity, a monolingual mindset aims to squash it. In contrast, a heteroglossic view of language diversity aims to respect diversity, and, in some instances, use cultural and linguistic resources as a tool to learn. Dual language programs are

defined as one which provides "literacy and content instruction to all students through two languages and that promotes bilingualism and biliteracy, grade-level academic achievement, and sociocultural competence—a term encompassing identity development, cross-cultural competence, and multicultural appreciation—for all students" (Howard et al., 2018, p. 3). These programs have the potential to use linguistic diversity as a tool for learning.

Dual language programs emerged through relationship-building and activism with and among families and communities in multilingual communities in cities like Miami, Laredo and New York City (Menken, 2017). Created with the goal of serving multilingual families, these programs aimed to serve immigrant and refugee families in such a way that both languages were used for instruction (Fishman & Lovas, 1970). Thus, when the needs of local communities are prioritized, dual language programs have the potential to disrupt the traditional role of educational systems in eradicating linguistic diversity by embracing a heteroglossic view. Unfortunately, as recent literature suggests, dual language programs are not, in and of themselves, a guarantee that the needs of local immigrant populations will be met. They may adopt policies that effectively exclude these students from the programs that were created to meet their needs. When strict language separation guidelines position heteroglossic language practices as deficient or not "true" bilingualism, the result may be what Martinez (2017) refers to as the erasure of Latinx and Chicanx students, in particular when those students do not fit into separate "native" language groups. Martinez writes that, for Chicanx students to participate in DL programs, they must make themselves fit into one or the other native group. "What this dichotomous categorization does not allow for—what it essentially denies or erases—is the very existence of bilingual children who speak both Spanish and English and who have grown up speaking both simultaneously" (Martinez, 2017, p. 84).

Another mechanism that results in the exclusion of Latinx or Chicanx emergent bilinguals is that DL, for it to function, relies on enrolling "native English speakers," often white, middle-class students. Studies show that in many cases where white, middle-class, native English speakers are recruited, these students' needs are privileged over the needs of working-class Chicanx and Latinx students. Bringing together groups holds promise for fostering cross-cultural understandings, but "programs actually fall short of achieving these aims" (Menken, 2017, p. 11). For instance, Palmer (2009) demonstrated that middle-class children were allowed more floor time in ways that allowed them to assert their status with the cooperation of the teacher. In light

of these findings, the research literature on DL programs have begun to refer to the gentrification of DL (Valdez, Delavan, & Freire, 2016). This process of gentrification promotes the view of DL as another option for privileged families to maintain their status. At the same time, working-class Chicanx or Latinx children can even be excluded from DL for not fitting neatly into the "native speaker" box, as described above. Thus, opportunities for Chicanx students to participate in enriching opportunities are closed.

Enriching opportunities for Chicanx students to use their bilingualism to develop STEM literacies are rare. Sometimes they are excluded from participating in enriching educational experiences. Either because they are seen as lacking vocabulary or English skills needed to do inquiry-based science and engineering. For instance, the vocabulary gap argument has been used to exclude immigrant families from "agentive learning experiences because they lacked vocabulary" (Adair, Sánchez-Suzuki Colegrove, & McManus, 2017, p. 309).

Opportunities to develop STEM practices are sometimes reserved for gifted and talented (GT) students. This is another problem because GT is often a way to keep schools segregated. "Low-income schools offer fewer high-level math and science courses, as well as fewer AP and gifted/ talented education programs" (Government Accountability Office (GAO), 2016). GT is a mechanism for white students to get resources that other students do not get. There is an underrepresentation of minority students. Part of the problem is that emergent bilinguals do not get to demonstrate what they know in their own language.

Research Setting and Methods

Ramos Elementary is located in a Title I school district, Maizales, on the outskirts of El Paso, Texas, a metropolitan area on the U.S.-Mexico border. It serves mostly Latinx (94%) economically disadvantaged (76%) students. During the 2016-2017 school year, Ramos Elementary school was comprised of 570 students. A significant segment (30%) of the overall population of the school consisted of students labeled as Limited English Proficient (LEP). We selected Ramos as the research site because of the STEM program offered for a majority of Latinx students, including those enrolled in DL.

Starting in 2011-12 Texas began to implement the creation of STEM high schools, or T-STEM Academies. These would receive grant funds if they implemented a T-STEM Design Blueprint that included partnering with an institution of higher education. The designation at the

high school level included resources and funding. At the elementary level, with no additional or guidance from the state, Ramos Elementary opened in 2015 and was announced as a STEM-focused school. Ramos created a pathway for students who enroll in the Maizales ISD's T-STEM Academy in the only high school in the district. Ramos leaders partnered with faculty from the local university; university faculty wrote a small grant that allowed the purchase of problem-based learning (PBL) kits. When the grant was awarded, leaders expressed great enthusiasm. The superintendent at the time was quoted in the local press saying that the PBL kits would be a link to the STEM program in the Maizales high school and would prepare students for those challenges. While the problem of the underrepresentation of historically underserved students is, without a doubt, a significant issue in STEM, what remains to be seen is whether such efforts will benefit underrepresented students such as first-generation students or Latinx and African American students or if they are doomed to reproduce existing mechanisms that benefit only some students.

In this ethnographic study, the research team observed the implementation of Problem-Based Learning (PBL) modules for two consecutive school years, both in the classrooms and in the STEM lab. For the analysis presented in this article, authors 1 and 3 observed every time the PBL kits were implemented (author 1 in the DL classroom and author 3 in the monolingual classroom, both in the STEM lab). We observed several groups; however, for the purpose of this article, we draw from data gathered in the 4th grade dual language classrooms. We focused on linguistic practices that may produce, reproduce, and/or disrupt the hegemony of English in the context of PBL. The overarching question for this research was the following. What are the language and literacy practices in a 4th grade engineering design curriculum? We sought to examine ways engineering design could contribute to specialized engineering discourses in ELs. In order to capture the dynamics and practices of the classrooms, extensive field notes were taken by researchers during PBL activities as well as other learning activities. Researchers also took pictures and audio recorded during observations in order to vividly capture conversations and collaboration among students and/or teachers and students. The research team analyzed interview transcripts from 4th grade teachers, field notes, audiotaped transcripts of classroom observations, and artifacts.

Data was collected and analyzed simultaneously and collectively. Through initial coding, raw data was coded through line-by-line coding to gain accurate knowledge of the actions and

processes being observed (Charmaz, 2014). The emerging analysis of field notes, interviews, and artifacts was condensed through focused coding, as recurring themes surfaced. Theoretical categories emerged during the analysis period. For instance, in observing classroom practices, student interactions and collaborative efforts, categories included literacy practices, translanguaging, classroom practices and language ideologies. In this article, we have organized our findings related to the first year of the study, and the implementation of PBL in the DL classroom we observed.

The Dual Language Program and Problem Based Learning at Ramos Elementary

The Dual Language (DL) program at Ramos serves the majority of the 28% of ELLs in the school. As is true in the entire school district, the DL program consists of students who are learning English and others who are learning Spanish. The model proposes a separation of language based on day of instruction. The DL program has been implemented in every elementary school and the middle school in Maizales ISD for over fifteen years. Thus, the district has extensive experience in implementing the DL program, and support for the program comes from district authorities.

Ramos implemented a PBL, engineering design curriculum school-wide, including in DL classes. PBL is associated with beneficial outcomes for all students. These include the following benefits: more meaningful learning experiences, engagement in real-world problems for increased relevance and skill transfer as well as the promotion of lifelong learning (Stearns, Morgan, Caprano, & Caprano, 2012). PBL involves a significant amount of active, self-directed learning, guided by a central question (Prince, 2004). It is through this self-directed learning that PBL provides an opportunity to help students develop lifelong learning skills and the ability to solve ill-structured problems.

During the first year, we observed one 4th grade DL classroom that consisted of 18 students and one teacher, Ms. Guevara.[3] Ms. Guevara taught all subjects and used two languages for instruction. Following the district guidelines, she separated languages by day. Science, for instance, was to be taught in Spanish if and when it fell on Spanish day and it was to be taught in English if and when it fell on an English day. Using these district guidelines, DL students were to

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[3] All names of participants and places are pseudonyms.

be exposed to the content of the PBL modules in two languages. However, as we show in this article, the division of languages was not followed as expected.

Problem-Based Learning at a STEM-focused school… In Two Languages?

As noted previously, the small grant written by university faculty served to purchase the PBL kits, which were designed to use engineering design to integrate mathematics, science and literacy. The grant also paid for training and a lab assistant to provide ongoing support during one year as well as yearly trainings from the publisher of the kits.

Even with this support, however, Ramos teachers faced a number of challenges to implementing PBL, especially at the beginning of the implementation. One of the first things we noticed was that teachers were not using the kits and the STEM lab even though we had paid for an assistant with an engineering degree to offer guidance. After meeting with the teachers in a large group setting, we organized grade-level meetings to show them how the kits could potentially be integrated with the state standards.

We observed that a few teachers were interested in implementing the modules. Two fourth-grade teachers, who were starting to collaborate on the implementation by going to the STEM lab occasionally, participated in the study. Ms. Guevara, a fourth-grade dual language teacher, and Ms. Aguilar a monolingual (in English) fourth-grade teacher, were invited to participate in the study. They agreed to participate by allowing us access to their classrooms for observations and doing the activities they had already initiated as well as facilitating the collection of student consent. When they accepted, the STEM lab assistant, a member of the team, began to work closely with them so that they would be supported in the new endeavor.

"Okay, so now, what would be the problem?": Framing the Problem

Doing PBL was full of challenges for Ms. Guevara (Ms. G) and Ms. Aguilar (Ms. A) in the first full year the kits were implemented. A number of factors made the implementation challenging, especially for Ms. Guevara, the dual language teacher. Indeed, the multiple challenges might have been insurmountable the first-year of implementation of the PBL curriculum: the DL program principles were soon discarded in favor of English instruction.

In order to meet the multiple challenges they faced in the initial implementation, Ms. Guevara and Ms. Aguilar teamed up and drew on their professional learning community (grade-level planning unit) as well as the assistance provided by the STEM Lab assistant to plan their lessons. This partnership meant that they planned together, and that their classes went to the lab together.

Because they were learning the content one step ahead of the students, this arrangement was very beneficial to them. This allowed them to meet one of the first challenges, which was how to meet state standards and also to use the kits. As Ms. Aguilar stated in an interview:

> The first year that we opened up and we had the training on the modules, it was a little overwhelming seeing the material and saying, "Ok, well it's project-based learning. It's, it's, it's STEM, it's Math, it's Science, it's engineering, but it's like, when we look at our curriculum, It's like OK, so this is my curriculum that I follow from beginning to end and then, this is the module, how do I take that and put it into my curriculum?"

As she notes, once the training workshop was over, they faced the true challenge, which was to implement a PBL curriculum and meet the state standards.

The main focus in fourth grade classrooms seemed to be the tested subjects: Writing, Reading, and Math; therefore, time and depth allotted to Science instruction were minimal. We observed both teachers in their individual classrooms as well as in the STEM lab expecting that we would see differences between the two—namely we expected that only one teacher would deliver instruction in two languages. However, we soon realized that the differences were not significant. While English and Spanish were used in the DL classroom, concepts, and ideas were not explored in depth when it came to PBL module classroom lessons. Moreover, while the teachers had worked together to plan, when the classes came together it seemed evident that the monolingual teacher took the leadership role in the team, with vastly more turns of talk and leeway to direct both classes.

Through our observation, we saw that PBL modules were taught in two settings: the classroom (for planning and discussion) and the STEM Lab (for building solar house models). The two participating teachers, Ms. Guevara and Ms. Aguilar, and their students were at the lab once

a week. During the first year of implementation, we found that the STEM Lab was a shared space for the DL and the monolingual classes. We observed that whole group instruction was mostly given by Ms. Aguilar, the monolingual English teacher. All instruction during these days was in English, with students responding to questions out loud in English, and turning in their work in English. We quickly realized that the STEM Lab became a space in which English was preferred and expected. When PBL modules were implemented at the STEM Lab, the only language of instruction and the only language encouraged from students was English, indeed English became the language of instruction in the STEM lab.

For instance, the first observation we conducted took place in the STEM lab. The session initiated with a quick introduction to the goal of the day's activities. Students were to test three types of materials in order to determine which of the three (brick, slate, or light tile) retains heat the best. The excerpt from that day's field notes is provided below.

> Ms. A drew Ss attention by clapping rhythmically, to which Ss signaled their attention by clapping at the same rhythm. Ms. A then reminded students of the purpose of the day's activities. Ms. A then asked students to think of the guiding question for the engineering activity. "What flooring material can capture more solar energy?" One S said "solar panels." Another student called out the materials to be tested "brick, slate and tile." Ms. A then asked Ss "what was your prediction?" to which a S responded, in one word, "brick" and other students responded with agreement "yes, brick." When Ms. G inquired about why brick would be the best material, a S said "brick captures light from the sun" and another S echoed, seemingly in agreement "maybe when the sun hits …" and trailed off without finishing. Another student, joined, saying "light reflects sun and bounces off." Ms. A, seeming to want to summarize before moving on, said "anyone else say brick?" and she received more agreeing voices regarding dark materials "dark captures energy" and "light has a lot of brightness. Ms. A then summarized "slate tile is dark" another person echoed "dark captures energy." (Fieldnotes, 11/08/16)

The excerpt shows that, in addition to instruction being provided in English, Ms. Aguilar took the leadership role, with Ms. Guevera speaking only once. The excerpt also shows that, to make

sense of the activity, students drew on their prior knowledge, i.e., energy absorption and reflection. What the excerpt does not show is that the whole segment moved very quickly, in approximately two minutes. Adults spoke quickly and sternly, perhaps conscious of being observed for the first time by a number of outsiders.

As noted previously, during the first year we expected that we would see significant differences between the two classes. However, both classes were remarkably similar. The excerpt below shows a representative example of how Ms. Guevara conducted instruction around the PBL kits in the first year. The student who responds to most of her question, Silvia K, was a student who we sometimes observed being pulled out of the classroom for gifted and talented instruction. During observations, Silvia K answered most of the questions and seemed to enjoy the respect and attention of her classmates and of Ms. Guevara. She would also sometimes correct Ms. Guevara's English pronunciation.

Ms. G: OK, so now (.) Ah (.) what would be the problem? We write the problem in our own words. What would be the problem? (2s) The problem is just one small part of it. We're not just looking for the type of problem, right? That's not the only thing that would make the house warm. What else do we need to make the house warmer? (Calls on student) Silvia K

Silvia K: The type of flooring?

Ms.G: The type of flooring is one thing. (calls on student) Silvia E

Silvia E: Um, the problem is that, uh, we need to find the right, the right materials for the … so, for the first step, um, the problem, is uh, they need to find the right material to use for the floor.

Ms.G: So, in other words, we need to plan it, right? (Silvia E: Yes). We need to plan it out. So we define the problem/ so what is exactly what they're finding? What, what they want? They want? (**SilviaK**: The flooring) What.

Paula: The best flooring material to heat their (.) houses? (SilviaK: To heat their houses)

Ms.G: But that's just not the only thing, right? (5s) Look at this. They need to become an engineer and figure out how to best use the sun to heat (.) homes (.) Not just your flooring materials! But the whole house! The flooring materials is a very important one! It's one of the ma/ it's one of the things they need to consider to have ah ah ah ah home that is going to be heated. So (.) so the problem is find a solution to what? (5s) The problem is find a solution to (speaks and writes on document reader) find a solution to best? How to best? Use the sun? To do what guys?

SilviaK: To heat homes!

Ms.G: To heat (.) homes (.) And yes we tested the flooring materials? That's going to be one of them right? So we defined the problem (11s) Now what would be the criteria to meet? I'm going to talk about criteria ok?

Students: Cri-te-ri-a

Ms.G: What does criteria mean? Does anybody know?

SilviaK: I was just going to ask you what it meant.

Ms.G: OK that's a good question. Criteria is when you need to follow certain rules. You need to have you have something set up to work

The excerpt suggests that the exchange appears to be a conversation between Ms. Guevara and Silvia K, with Paula chiming in occasionally. As the teacher got most of her cues from Silvia, Ms. Guevara moved on before checking to see if other students were understanding the material as well.

Entonces vamos a hacerlo en inglés: Justifying Monolingual Choices in DL

As noted previously, the decision to deliver instruction in English in the dual language classroom was purposeful. Unfortunately, this arrangement was incompatible with the goals of the dual language program because they relegated Spanish and Spanish speakers to a secondary position in the classroom and in relation to English, particularly in relation to the kind of language and literacy practices associated with STEM.

In an interview conducted during the second year of implementation, which meant that Ms. Guevara had some time to reflect about it and to improve on the first-year experiences, she explained the choice very succinctly when she was asked why they decided to do engineering design in English. The transcript is presented here in English translation due to space constraints.

It was because we did not have the material in Spanish. That's why and, besides that, the time to do science was limited because, again, in fourth grade we focus on reading, writing and math. When we decided to do science (and it was the first time we tried it out), I felt insecure. She (Ms. A) felt insecure, so then we said,

why not try it together? And since we didn't have the material in Spanish, we said "well, let's do it in English." And that was the reason.

Ms. Guevara's response regarding how the choice was due to time, experience, and materials suggests the complex ways language choices become constrained in light of the monolingual habitus of many schools, including those that implement dual language programs.

Perhaps even more revealingly, during the interview Ms. Guevara was reminded that Spanish materials *were* available in the first year. The Spanish material was used by the group of four students identified by the state as Limited English Proficient who tended to always sit together. This group was the only one who had access to the Spanish materials and, perhaps significantly, that material was forgotten in the second year of the implementation. At the reminder, Ms. Guevara said, "I think there was *one* in Spanish and we did use it a few times. I do remember that we used the Spanish material a few times. But [science] always fell on English day or we made it fall on that day precisely because we didn't have the material, or we could not find it and so that's why it stayed in English."

Thus, as Ms. Guevara revealed, the engineering material was covered only on English days. It should be reiterated that Ms. Guevara was the only dual language teacher in her grade level that year. Compared to the monolingual teacher, she played a supporting role. However, she was very sensitive and caring about students as will be discussed next.

"Who can tell me in their own words?"

With instruction delivered in English, Spanish was relegated to a secondary status in the first-year implementation of the PBL curriculum. As noted earlier, the DL teacher decided to implement it in English due to constraints of time, materials and experience. In this section, we will discuss the few instances of Spanish use in the module. We will also mention how the choice impacted students.

While English was the language of instruction, Spanish was used only for support in the DL classroom. Instances of Spanish use were observed very rarely and mainly for support, rather than instruction. With students who had been identified by the state as LEP or Spanish dominant, Ms. Guevara offered them to participate in whole group discussions in Spanish when they were not able to participate in English. Spanish use was not observed to be used with English dominant

students, nor was speaking in Spanish offered as an alternative for students to complement their English classroom participation.

On one occasion, students and Ms. G were working on the Solar House project. On this date, they worked to understand what the problem to solve would be. In order to do that, they relied almost exclusively on the materials to understand the problem. Next, Ms. G asked students to consider what the problem was. She used the document reader to project a description about what engineers do. She asked students to read the English description chorally.

> Once students finished the choral reading, Ms G asked Ss if anyone could paraphrase it. "Who can tell me in their own words?" Ss were quiet and she added "you just read it." She called, again, on Carla, who hemmed and hawed. Ms G told her that she could say it in Spanish. Carla opted to say her understanding in Spanish. "*Necesitamos ingenieros para que se puedan construir una casa y que el piso no es um todo lo que van a hacer. Y tienen que encontrar cual una casa que con el sol se pueda?*" (We need engineers so that they can build a house and that the floor is not, um, everything they will do. And they have to find a house that the sun can…"). Ms. G interrupted Carla and finished the sentence. "… *absorber la energía del sol, verdad? Para mantenerla… calientita o fresca?*" (absorb the sun's energy, right? To keep it warm or cool?). Ss answered "*calientita*" (warm). (Fieldnotes 11/15/16)

The excerpt shows that Carla had the option of saying her understanding in Spanish. However, it suggests that her understanding of the purpose of the project is still developing or that she might not have understood the purpose of the activity. Earlier in the day, another student, Leonardo was offered the opportunity to say his understanding in Spanish, and he was not able to complete a sentence about his understanding. With few connections between languages, rare connections to prior knowledge and funds of knowledge, and with Ms. Guevara teaching the content for the first time, perhaps it is not surprising that students were unsure about what the purpose of the module was.

Perhaps most alarmingly, the choice to implement the PBL modules in English might have had a negative effect on students. At least two instances of negative effects on emerging bilingual students were gathered. On one occasion, in the STEM lab (an English monolingual space), Carla,

the DL student mentioned above, was working with a team consisting of students from the dual language classroom, who she knew, and students from the monolingual classroom. On that day, students were testing their model in order to see if the flooring materials kept heat energy, and they had to measure temperatures of the models at set times.

Carla's team had a disagreement that day because the team misunderstood directions. Upon discovering that the team had not followed instructions, Ms. Aguilar reprimanded them: "You guys didn't know what you were doing. I asked if you had any questions. What are you going to put at the 20 minutes? You should have kept going." After the reprimand, students were upset at each other. They regrouped and the two students who were leading the measurement of the temperature, including Carla, were replaced with two girls from the monolingual class.

> Carla told the two new team leaders that she was upset. "You guys decide and I can never decide nothing. You left me out. Don't tell me it's not true cause it's always true. Yeah, you always decide before I even agree." At that she left the station and went to sit at the table.

With Carla crying, Ms. Guevara went to see what was going on. On another day, I asked Ms. Guevara about the incident. She said that she thought that the DL students feel inferior and that she thought that this is why the incident had happened.

In an interview, Ms. Guevara told me that another emergent bilingual student, Leonardo, had had a conflict when working with the monolingual class.

> One of the students came to me and he said, ah, he said that because I told him, well you're not participating, you need to participate more. You know that you're gonna receive a grade for participation and I don't see you doing anything. And when he told me that's when I started observing them because they told me, well this other kid told me that I couldn't participate because he couldn't understand what I was saying. So, they left me out.

A third incident suggests that hegemonic practices defeated the equity goals of the DL program model. As noted previously, students classified as LEP sat together in a segregated

group in the DL class. During a discussion on the budget for the solar house design, Leonardo and Carla were sitting together. Ms. G asked groups to discuss how much money their design elements would cost. As the allotted time was winding down, and with 30 seconds to go for their discussion, Leonardo and Carla discussed the cost and number the windows for the design. Leonardo translanguaged and said that "*los sides no cambian*," meaning that the cost of the windows would not change. The response he received from Carla was "you need to learn how to speak." The time ended and the discussion moved to another topic, and Leonardo was effectively silenced by his DL class peer.

Taken together, these incidents suggest that, even in the DL classroom, students labeled as "LEP," had a secondary status. They were separated into a special group, which was formed based on their language proficiency (Spanish dominance). Members of this group were observed participating less than those who were not labeled LEP in the fast-moving discussion around the passive solar house project. In the STEM lab, English discussion sometimes resulted in a feeling of exclusion, as illustrated by the incident in which Carla was moved to tears ("you left me out"). Only this group had access to Spanish PBL curricular materials, whereas the other groups had English materials and their teacher modeled science notebook writing only in English.

Ms. Guevera's interpretation of these incidents—that the DL children felt excluded—suggests that she was sensitive to her students' feelings and empathetic to their feelings of exclusion. Unfortunately, we did not witness her adjusting her teaching so that students in the "LEP" group feel less excluded. However, she did decide to change course for the following year. At the end of the first year she confided in us that she would not continue her partnership with the monolingual class. By the time she announced this to us, she also knew that she would no longer be the only DL teacher in fourth grade and that, due to high enrollment, she would be joined by another DL teacher with whom she would be partnering.

Discussion and Conclusion

As we have shown in this article, decisions about how and whether to deliver instruction in two languages in PBL modules were not easy. Teachers grappled with a few factors, including the lack of experience in doing PBL and a testing and accountability system in which subjects that are not tested are considered low priority. Given these tensions, teachers turned to each other for support and the resulting partnership between a monolingual and a DL teacher led to some

difficult choices for the DL teacher, Ms. Guevara. Delivering instruction in only one language might have seemed to be the best (or as she put it, the easiest) choice.

This main finding illustrates the idea that linguistic hegemony is non-coercive—policies and practices legitimate the dominant language (Macedo et al., 2003). Thus, testing and accountability policies and practices both relative to the education of emergent bilinguals and to testing in general were understood to have priority over other concerns, including student learning and well-being. Because state policies track students labeled as LEP, students were categorized as either Spanish-dominant or English-dominant, with the state tracking and labeling students based on their English proficiency. With the covert goal being fluency in English (not Spanish), it was readily apparent that the status and dominance of English and English speakers was unquestioned, even by the DL teacher and program structure.

When Spanish was observed, it was only as a resource or accommodation for students who had not yet attained fluency in English, as noted above. Spanish is thus the marked language choice; biliteracy development did not seem to be a goal of the program during the first year. The status of Spanish was also low given that it was a resource during PBL only for the small group of students labeled as Spanish dominant. The members of this team were usually the only ones for whom Spanish materials were provided. They were observed reading the materials in Spanish and they wrote in their notebooks and worksheets in Spanish. However, the second year of the project, Ms. Guevera noted that there were no materials in Spanish provided, which is why doing PBL in Spanish was impossible. English hegemonic practices prevailed, and the perceived lack of Spanish materials might have been a reflection of the symbolic erasure of Spanish (Zentella, 1997; Martínez, 2017).

All of this was understood to make sense within the urgent situation Ms. Guevera was in (little ongoing professional development, lack of experience in doing PBL). However, it should also be noted that the program also divided students into groups of Spanish-dominant and English-dominant students, which did not match the linguistic repertoire of the bilingual community. We observed students using Spanish to socialize, to joke and to share experiences with each other, which means that even if a student was identified as English-dominant, it did not mean that they were not, in fact, bilingual. Thus, as Martínez (2017) notes translanguaging practices became erased by ideologies of linguistic purism of the DL program.

The practices documented here are illustrative of language hegemony and counterhegemony. Rather than what discourses *say*, we have focused on what and how discourses *do* in practice. The dual language program is a site that counters the hegemony of English, when Spanish is used as a legitimate language of instruction. Unfortunately, in the first year of implementation, we observed practices that reproduced the hegemony of English. Practices such as language separation and the observed censure of translanguaging in the classroom suggest that hegemonic practices prevailed in the first year of implementation of the PBL kits.

Finally, to return to the goal of a STEM-focused school—to create pathways of participation for underrepresented groups in STEM fields—this study suggests that the pathway is rocky and fraught. It raises questions whether emergent bilingual Latinx children's perceptions of science and engineering might be tainted by experiences in which they feel excluded or marginalized. The potential to construct the DL program as a space that is inclusive of Latinx and Chicanx children was latent in the first year. The PBL engineering modules cross the borders of the elementary school and allow Latinx elementary children to learn the contents of engineering, a subject that traditionally was not taught at this educational level.

Postscript

In this article we have attempted to show the ideologies that construct the hegemony of English in engineering in a DL classroom. We focused on the first year of the implementation in which Ms. G and Ms. A worked together. As the implementation of the PBL curriculum continued in subsequent years, Ms. G partnered with another DL teacher. With the work of two collaborating DL teachers, the engineering design curriculum was consciously and carefully implemented following both the PBL curriculum guidelines and DL principles. During the second year, we documented the ways in which fourth grade teachers collaborating in the 4th grade DL program were able to design meaningful instruction in engineering design following an equal distribution of Spanish and English. Equally important, the students used their multiple linguistic and cultural resources in order to participate in engineering design. The potential of the DL program for equity started to become a reality.

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