Flowing With the Translanguaging *Corriente*: *Juntos* Engaging With and Making Sense of Mathematics

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Abstract

The translanguaging *corriente*, or current of language practices, as described by García et al. (2017), is always flowing through your mathematics classroom, whether you realize it or not. The *corriente*, how multilinguals use all their languages to learn and engage with content in school and make sense of a complex world, requires educators to reconsider what is understood about language and mathematics. By rethinking how we view language separation in the multilingual mathematics classroom, we propose that teachers teach with a translanguaging stance in order to access multilingual students' full linguistic repertoires and to develop deep mathematical understanding.

Discussion And Reflection Enhancement (DARE) Pre-Reading Questions

1. What does it mean to "know" a language? Is there only one English language, one Spanish language, one Russian language, etc.?

2. Consider how you communicate with different groups of people in your life. Does the context make a difference in what you say and how you say it? How could we start to understand language as occurring in practice and in particular contexts and not having to do with the amount of words you know in a particular language?

3. What are your beliefs with regards to language of instruction in mathematics for multilingual students? For example, what are your thoughts about the language that should be used for instruction during math time? Where do these beliefs come from?

4. Have you heard the term translanguaging mentioned when talking about language acquisition? Consider what you know about language acquisition. Are your ideas of language acquisition built on a model of language separation, where specific languages get directed instruction time? What might it mean if language learning was always occurring regardless of the language of instruction?

5. What should be some goals for what it means to know and learn mathematics in multilingual classrooms?

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For many, the terms "bilingual student" or "multilingual learner" are synonymous with "English learner" and represent challenges for mainstream educators (Flores & Rosa, 2019). As Gutstein (2007) reminds us, "language is about power" (p. 245) and this has been proven through the history of subtractive bilingual programs in the U.S. and a monolingual bias towards English-speaking children that continues to position multilingual students' languages as insufficient or lacking (Flores, 2016; Gándara & Hopkins, 2010; Langer-Osuna et al., 2016). Research has often focused on the mathematical vocabulary multilingual students lack and the difficulties they face in learning in a monolingual English mathematics classroom (Téllez, Moschkovich, & Civil, 2011). These students are assessed through a view of languages as separate entities to develop in isolation, and thus, the instructional focus is on the products that children produce, or do not produce, in English-speaking classrooms (Otheguy, 2016). But educators are being asked to reconsider this inaccurate view of language acquisition and to instead consider a dynamic bilingualism that transcends beyond social borders of language (García & Kleyn, 2016b). We encourage the reader to refer to the work of García & Kleifgen (2010) and García & Kleyn (2016b) for more information on different models of bilingualism and language practices.

Multilingual children often face strict language separation in their schooling, through various bilingual education program models, including dual language, in which a "target language zone" is used for specific content learning in one language at a time, operating under the view that acquiring language depends on using only one language at a time (Palmer, Martínez, & Mateus, 2014). A renewed understanding of the dynamic language practices of multilinguals asks us to move beyond a narrow definition of language and use an understanding of *translanguaging*: "the deployment of a speaker's full linguistic repertoire which does not in any way

correspond to the socially and politically defined boundaries of named languages" (García & Kleyn, 2016b, p. 14). In other words, educators must learn to view multilingual children as using all their languages all the time. So, what does that mean for the mathematics classroom?

Research in mathematics education advocates for practices that celebrate all students' mathematical reasoning and ways of knowing (Turner & Drake, 2016). The translanguaging literature (García & Kleyn, 2016b) would call this a *stance* about mathematics teaching and learning and posit that teachers of multilingual students must also teach from the understanding that language is always a resource for the learning, thinking, and creating that occurs in a mathematics classroom. A *translanguaging stance* in a mathematics classroom means designing a space in which the teacher views and understands the complexity of multilingual students' language practices, recognizing that they are a powerful resource to draw upon and connect to mathematical learning. García, Ibarra Johnson, and Seltzer (2017) further identified four translanguaging pedagogical strategies to enact with students: (1) supporting students as they engage with and comprehend complex content and texts; (2) providing opportunities for students to develop linguistic practices for academic contexts; (3) making space for students' bilingualism and ways of knowing; and (4) supporting students' bilingual identities and socioemotional development. We argue that these pedagogical strategies also have a place in the multilingual mathematics classroom.

In this article we propose a description of a translanguaging stance in multilingual mathematics learning environments. While examples of translanguaging have been made in other contexts, there remains a need to better understand translanguaging in mathematics contexts (Kleyn, 2016). In particular, we make the case for moving past traditional language separation practices and utilizing and understanding how language flows like a *corriente*, a river current, in the mathematics classroom to make deep mathematical connections (García et al., 2017). We provide an example from a second and third grade two-way dual language classroom to supplement our discussion of translanguaging mathematics classrooms.

Making the Case for Translanguaging in the Multilingual Mathematics Classroom

At the root of translanguaging theory are notions of social justice (García et al, 2017; García & Kleyn, 2016a), which occurs by working alongside, or *juntos* with, multilingual students and the empowerment that comes from the accepting and valuing of their multilingualism. Awareness of the history of how language is used to control, categorize, and racialize the language practices of multilingual students (Flores & Rosa, 2015) requires analyzing educational policies that continue to position these students as children in need or limited in language (García & Kleyn, 2016a). As hooks (1994) states "...it is not the English language that hurts me, but what the oppressors do with it, how they shape it to become a territory that limits and defines, how they make it a weapon that can shame, humiliate, colonize" (p. 168). García & Kleyn (2016b), whose translanguaging study in New York encompassed multilingual teachers and classrooms, often asked teachers to think of how Spanish, spoken by those from various economic and social backgrounds, comes in many acceptable forms in which people manage to communicate. They asked educators to make the connections to when Spanish was first "standardized" as a way to control the colonized people of Latin America in the 1400s and recognize that what we call Spanish, Russian, and English are merely social labels that do not really define language and how language is used in day-to-day contexts. They argued that remnants of this control are still exerted in schooling today through limited and narrow assessment of multilinguals' language abilities. Translanguaging, then, also requires educators to understand the context of being multilingual in U.S. schools and further recognize how many of these students face a racialized experience of school and of mathematics learning (Adams, 2018; Martin, 2009; Flores & Rosa, 2015; Zavala, 2017) A translanguaging stance in the mathematics classroom means that attempts to improve multilingual students' experiences with mathematics require an anti-racist stance which challenges traditional practices and reimagines what it means to be in math class. This further requires understanding how language has typically been constructed by educational policy and considering what it

means to disrupt traditional views of multilingual students' language repertoires (García & Kleyn, 2016a).

García and Kleifgen (2010) encourage us to move past traditional language instructional practices that separate languages (i.e., English time and Spanish time, either by day or content area) and instead consider the "dynamic bilingual practices" that multilinguals enact that are context- and person-specific and fully immersed in interactions with different speakers. The visual of the translanguaging *corriente*, a flowing river metaphor by García et al., (2017) encourage us to interpret the dynamic and constant flow of language features that multilingual students are tuned into in the classroom. They recommend educators take a step back and listen to the flow of dialogue and conversation that takes place in the classroom, school, and community, all without the need for language separation. For the mathematics classroom this *corriente* is present as mathematical ideas are shared and taken up by the members of the classroom, and instead of focusing on a concept of linguistic proficiency, the focus can be on linguistic performance.

In a translanguaging mathematics classroom, then, part of the *corriente* means allowing the flow of mathematical ideas to be shared without restriction towards form, especially for making conceptual connections (Maldonado, Krause & Adams, 2018). A translanguaging mathematics classroom includes teachers making deliberate choices to use children's thinking while engaging in mathematics instruction that develops knowledge, dispositions, and practices that not only support the development of children's mathematical thinking, but also build on students' cultural, linguistic and community-based knowledge (Turner et al., 2012). When teachers purposefully co-construct a translanguaging mathematics classroom *juntos* with multilingual students and flow with the translanguaging *corriente*, we posit that students expand their sense of what they can do mathematically and develop a sense of what mathematics can be.

We now provide an example from a second and third grade dual language classroom to reflect on the translanguaging pedagogies that García et al. (2017) explained are critical for supporting and valuing multilingual students: (1) supporting students as they engage with and comprehend complex content and texts; (2) providing opportunities for students to develop linguistic practices for academic contexts; (3) making space for students' bilingualism and ways of knowing; and (4) supporting students' bilingual identities and socioemotional development.

Translanguaging in a Dual Language Mathematics Classroom

Ms. Acuña (a pseudonym) taught in a two-way dual language (TWDL) classroom at Granger Elementary in a large city in the Southwest U.S. She taught the same group of students for their second and third grade years. The district had imposed a form of TWDL, requiring language separation that occurred along the lines of content area, with mathematics to be taught in English. However, administrators at Granger granted its teachers some professional autonomy and allowed instructors to design their own instruction.

Out of the 23 students in Ms. Acuña's classroom, one student identified as both Black and White. while the other 22 identified as Latinx, with families from Mexico, El Salvador, Honduras, and Puerto Rico. All 23 students spoke Spanish and English, and one also spoke Otomí, an indigenous language from Mexico.

Ms. Acuña and her students were used to engaging with mathematics in multiple ways. There might be number talks to share mental computation strategies, word problems that were based on a book, or the class mathematizing something a specific student had shared during the morning community meeting, or a mini lesson based on a specific math objective. Ms. Acuña often taught integrated units based in children's literature that involved building students' critical consciousness of power dynamics and inequities in the world around them. As a result, math time was not limited solely to a particular time of the day, and students could often be heard making mathematics connections during "non-math" time.

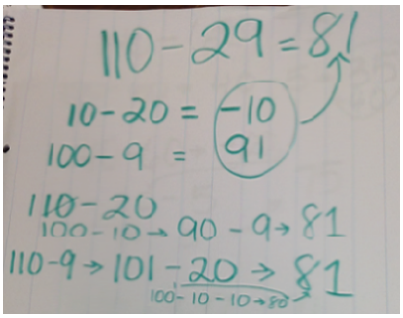
Ms. Acuña's students shared strategies for the following number talk in May of third grade:

$$110 - 29 = \square$$

Rubén shared his invented algorithm strategy orally, and Ms. Acuña scribed his idea. Next, Hernán shared his strategy, which Ms. Acuña recognized as an incremental strategy that was similar to his past mental strategies for subtraction problems. Ms. Acuña then used Hernan's oral strategy to write an equation that represented the strategy he was sharing (Figure 1).

Figure 1

Rubén's and Hernán's strategies



Ms. Acuña: *Rubén, ¿qué te salió?* (Ruben, what did you get?)
Rubén: *Eighty-one*
Ms. Acuña: *¿Cómo sacaste eighty-one?*
Rubén: *I took… ten… hice diez quítale veinte y luego, negative ten*
Ms. Acuña: [writes 10 - 20 = -10] *¿Así?*
Rubén: *Sí. Y luego le quité nueve al cien* (Yes, and then I took 9 from 100.)
Ms. Acuña: *¿Y qué te salió?* (And what did you get?)
Rubén: *Me quedaron noventa y uno* (I was left with ninety one.)
Ms. Acuña: [Writes out 100 - 9 = 91] *Noventa y uno* [circles 91 and -10].
Rubén: *… y al noventa y uno le quito un diez y me queda ochenta y uno.* (And to the ninety-one I took a ten and I was left with eighty-one.)
Ms. Acuña: *Ah. Entonces, noventa y uno con menos diez, te da ochenta y uno.*
Ms. Acuña: *Okay. ¿Alguién lo hizo de una manera diferente?* (Did someone do it a different way?)
Hernán: *Um, what I did is that I minused, twenty, twenty from the ten and I get ninety.*
Ms. Acuña: *Okay, so kind of like a hundred and ten quítale veinte, take away ten.*
Hernán: *Yeah, that equals ninety and then I did ninety minus nine.*
Ms. Acuña: *Y te salió ochenta y uno. Me acuerdo que tú has estado quebrando números pero manteniéndolos juntos, has estado compartiendo estrategias así.* (And you got eighty one. I remember that you have been breaking up numbers but keeping them them together. You've been sharing those kinds of strategies.)

Throughout this interaction, we observe how Ms. Acuña facilitates an interaction that elicits mathematical ideas in both English and Spanish, thus translanguaging was occurring both between two students and between students and the teacher (Kleyn & Yau, 2016). The switch from one language to another was instantaneous and needed no translation, the teacher and students were immersed in the translanguaging *corriente*. The students were already accustomed to an expectation on comprehending the strategies being shared. Again, a traditional view of language might view the "code-switching" between languages in one sentence, such as Rubén and the teacher did, as "incorrect language" or a lack of either English or Spanish proficiency. However, with a translanguaging lens, we can instead view this interaction as an example of dynamic bilingualism. Rubén and Hernán were intent on explaining their strategies, and Ms. Acuña was intent on making sure she represented their oral strategy with symbolic numeric notation in order to better provide access to the rest of the class. In sharing his strategy so easily in this discussion, Hernán both acknowledges that his strategy was different than Rubén's, which was stated in Spanish, and goes on to share his own strategy and choosing to use English. The very fluidity of the conversation appeared to aid, rather than hinder, the eliciting of mathematical ideas. Rubén's strategy allowed the class the opportunity to explore the use of negative numbers and to discuss rich mathematical ideas about subtraction. The teacher was supporting students as they engaged in complex content through her questioning and scribing of student ideas.

This interaction can also be analyzed from a mathematics teaching perspective as an example of a teacher who understands children's multidigit addition and subtraction strategies (Carpenter et al., 2014) and is purposefully sharing strategies that will also shift the mathematical understanding of the entire class. Eliciting strategies that made sense to students meant that students in Ms. Acuña's class often shared invented strategies for subtraction that relied on the properties of operations and not on a traditional algorithm. It was important that Ms. Acuña scribed the strategies shared. This can be viewed as an example of the "text" of mathematics. Providing visuals to the children's oral strategies is another way to support students as they engage with content and provides opportunities for students to develop linguistic practices in mathematics. When teachers begin to make instructional decisions based on how their students understand mathematics, teachers can begin to view their multilingual students' mathematical thinking in an

empowering way, by positioning the students as mathematical thinkers and creating a shift in who "does" mathematics (Turner et al., 2013). Thus, making space for students' bilingualism and ways of knowing was also the norm for what it meant to do mathematics in this classroom.

In a translanguaging space, supporting students' bilingual identities and socioemotional development means bringing together all members of a classroom community, along with their languages (García et al., 2017). In mathematics classrooms, this support intertwines a focus on children's thinking with linguistic and cultural awareness. As an example of what this looks like, we turn to this problem that Ms. Acuña posed to her class in second grade: *La semana pasada recolectamos 38 dólares en la jarra para mandar dinero a Flint. Si después de una semana, tenemos 60 dólares almacenados, ¿cuánto dinero recolectamos durante la semana? (Last week we collected $38 in our jar for Flint. If after this week we have $60, how much would we have collected during this week?*) This problem, a Join Change Unknown problem (Carpenter et al., 2014), was part of a unit in which Ms. Acuña and her students explored how children were affected by the Flint water crisis. The students suggested they should raise money for Flint children, extending the unit and providing a meaningful context for problems (Dominguez, 2011). After unpacking the problem and having students work individually, Ms. Acuña gathered the class to discuss strategies. She first asked Hernán to share his strategy.

Ms. Acuña: *Hernán cuando empezó hoy tuvo una idea de que iba a ser la respuesta. ¿Qué pensabas que iba a ser la respuesta?* (When Hernan started today, he had an idea that he knew was going to be the answer. What did you think the answer was going to be?)

Hernán: *32*

Ms. Acuña: *32. Y yo escuché esa idea de 32 de muchas personas. Que no me parece una idea loca. Me parece una idea que muestra mucho pensamiento. Tenemos la idea de que 30 y 30 hacen 60. También tenemos la idea de que 8 con 2 hacen el 10. Entonces esa idea enseña mucho pensamiento. ¿Pero qué pasa si tratas de sumar 38 con otros 30?* (32. I heard the idea of 32 from many people. It does not seem like a crazy idea either. It seems like an idea that shows a lot of thinking. We have the idea that 30 and 30 make 60. We also have the idea that 8 and 2 make 10. So this idea shows a lot of reflection. But what happens if you try to add 38 and 30?)

Kellys: *68*

Hernán: *Le quito un 10…* (I take away a 10.)

Ms. Acuña: *¡Ah! Eso es lo que te diste cuenta. So Kellys dice que si le sumas 30 a 38 vas a tener 68. Te vas a pasar de más. Pero él dice le puedo quitar un 10. ¿Con qué empezaste aquí? Me dijiste, vamos a empezar con 38 y él pensó que el 32 era de más. Se había pasado, hizo demasiado. Entonces le quitaste un 10 al 32 y pensaste mejor 22. ¿Por qué le quitaste el 10?* (Ah! That is what you realized? So Kellys says that if you add 30 and 38, you'll get 68. You're going to go too far. But he says I can take a 10. What did you start with here? You told me, let's start with 38 and I think that 32 will be too much. He had passed, he did too much. So, you took a 10 from 32 and thought instead 22.)

Hernán: *Porque le puedo pasar esto aquí y esto va a hacer un 10…*(Because I can pass this here and it will make a 10.)

Ms. Acuña: *¡Ah! Hernán se dio cuenta de que esa decena del 30 ya la tenía escondida en las unidades. Dijo ¡ah! Estos 2, si yo los uno con los 8, hacen el 10. Y puedo encontrar 30 más 30 ó 40 más 20. Muy interesante. ¿Qué otras estrategias usaron hoy?* (Ah! Hernán realized that the tens in 30 was hidden in the ones. He said, ah! These 2, if I put them with the 8, they make 10. I can find 30 and 30 or 40 and 20. Very interesting. What other strategies did you use today?)

Enrique goes on to share his incremental strategy of starting at 38 and counting up to 60. Ms. Acuña mentions this was similar to Gina and Mariel's strategy and has the class count along as they re-enact Enrique's strategy on the whiteboard to arrive at the answer of 22.

In this example, Ms. Acuña purposefully asks Hernán to share his mathematical idea, even though it is not a correct solution. As Hernán shared his strategy, Ms. Acuña validated the idea that it is understandable why Hernán and others might have thought the solution was 32. As a class, Ms. Acuña's students built not only mathematical language together, but they also built an understanding of what is commonly called *regrouping* in the elementary mathematics classroom. As Hernán shared his solution, he chose to share his ideas in Spanish. In this particular episode, allowing him to use his linguistic repertoire provided a space not only for Hernán, but for the entire class. Language was a tool through which

mathematical understanding occurred. Ms. Acuña did not force a particular format upon the student's explanation. The teacher took the role of listening and amplified students' strategies as they made sense of each other strategies and the mathematics (Kleyn & Yau, 2016).

Moschkovich (2015) posits that mathematical literacy is not just about the cognitive aspects of mathematics, it is also situated in experiences, such as within discussion and being able to express one's ideas in a known language. Thus, it is the participation in mathematical practices, in this case discussion of strategies, that leads to mathematical proficiency for multilingual students. In these interactions, Ms. Acuña was both supporting students as they engaged with and comprehended complex content and texts and also supporting students' bilingual identities and socioemotional development. She made a purposeful decision, due to her knowledge of the students' literacy in mathematics, to flexibly use Spanish as the means through which to encourage a powerful strategy in the classroom space.

Final Thoughts

The translanguaging *corriente* was a resource in Ms. Acuña's TWDL classroom, and due to the classroom's shared mathematical work throughout not just one, but two years, both bilingual and mathematical identities were developed and encouraged. Recognizing the capacities and thinking that students already bring into our classrooms (Turner & Drake, 2016), and centering them with a view of language as a fluid, communicative tool (García & Wei, 2014) promotes students' mathematical agency. This is accomplished by amplifying the connections and mathematical comprehension generated (Kleyn & Yau, 2016) and allowing multilingual students to demonstrate the extent to which they are already mathematical doers. We encourage educators to begin to view the language practices of their multilingual students and to consider a translanguaging stance. When they do so, students not only have the opportunity to explain and understand in more than one language, but also simultaneously create mathematical agency around multilingual identities.

For those worried about the dissolution of "language separation," we reiterate that emphasizing mastery of English (or Spanish) is using language to obfuscate the racialized experiences of multilingual students, for they will still be critiqued even when they are speaking English "proficiently" (García et al., 2017). Let us instead view translanguaging as an empowering and critical act for multilingual students. Viewing mathematics learning in multilingual classrooms through the lens of language practices and continuing to research and explore how the translanguaging *corriente* builds strong mathematical literacy for multilingual students by building on the strengths of their full linguistic repertoires.

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Discussion And Reflection Enhancement (DARE) Post-Reading Questions

1. Why is it important for a teacher of multilingual students to know the historical and political consequences of language policy programs on how multilingual students' language proficiency is determined?

2. How could you bring your students' full linguistic repertoire into the mathematics classroom?

3. If you are not bilingual, how could you begin to be aware of the translanguaging *corriente* in your classroom and use it *juntos* with your students for mathematics learning?

4. A good resource for further understanding translanguaging is the CUNY-NYS Initiative on Emergent Bilinguals. Download their free Translanguaging Guides at https://www.cuny-nysieb.org/. What translanguaging practices will you build into your mathematics teaching?

TODOS Live!

TODOS Live! began with funds obtained through a NCTM Mathematics Education Trust grant. Through the years TODOS Live! has had many excellent sessions and presenters. These sessions are generally an hour in length and occur in the late afternoon when classroom teachers can participate. A list of previous recordings and upcoming sessions can be found at https://www.todos-math.org/todos-live. Since mid-March 2020, 13 TODOS Live! sessions have occurred and many are planned the remaining of 2020. Please note that due to limitations to online storage, access to some of our sessions has been lost. Currently, sessions are being stored on a TODOS Live! Vimeo Channel (https://vimeo.com/user56336191).

Become involved with TODOS Live! Contact todoslive@todos-math.org to volunteer or to share comments, questions, or suggestions. Hope to hear from you and "see you" online.