NO PUEDO

"I don't get it." Assisting Spanglish-speaking students in the science classroom

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A few years into my teaching career, I (Benavides) became aware of the Spanglish phenomenon in the classroom. As I and one of my English Language Learners (ELLs) discussed science, we switched back and forth between Spanish and English to work around the student's lack of fluency. This reminded me of how I often communicated with playmates and family members as a child growing up on the United States–Mexico border.

ELLs' early schooling often involves a mix of their native (L1) and second (L2) languages. Spanglish speakers take this one step further and employ a hybrid language practice to compensate for their lack of fluency in both Spanish and English. Unlike conventional ELLs, these students use the two languages simultaneously because of a lack of proficiency in either (Martinez 2010).

Who are our Spanglish-speaking students?

Spanglish-speaking students intuitively understand how to mix the two languages (Sayer 2008). They use Spanglish as a semantic tool to convey slightly modified meanings (Martinez 2010) and shift their use of Spanglish according to their audience.

Spanglish occurs in various dialects (Rothman and Rell 2005). "There is not one Spanglish but many (e.g., Californian, Cuban American, Nuyorrican, Dominicanish, Mexican)" (Stavans 2003, p. 136). These differences contribute to the disagreement among linguists with regard to the grammar of code switching (Sayer 2008). Figure 1 offers examples of three Spanglish forms: borrowings, code switching, and calques. Other forms (e.g., localisms) exist as well.

Supporting language transitions for Spanglish-speaking students

Throughout my years of teaching biology to ninth-grade students in our border region, biomolecules has always been a daunting topic. This vocabulary-rich subject is difficult for students due to their limited knowledge of biology and chemistry and inability to visualize the abstract concepts. Spanglish speakers often have the hardest time because of their limited fluency. To address this problem, I begin instruction in students' social language, using their own examples, definitions, and explanations, and then I gradually move into the

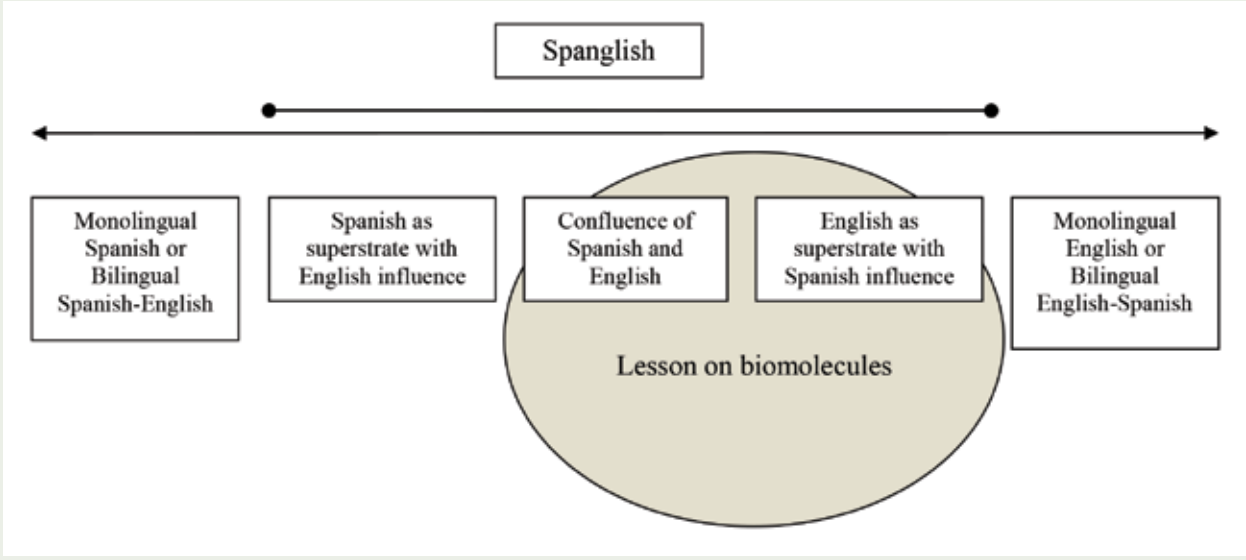
FIGURE 1

Common forms of Spanglish.

Spanglish form	Definition	Examples
Borrowings/loan words	Loaned words from one language are pronounced with the phonological rules of the other (Rothman and Rell 2005).	English verb: *Mop* Spanish verb: *Trapear* Spanglish verb: *Mopear* English verb: *Watch* Spanish verb: *Mirar* Spanglish verb: *Wachar*
Code switching	Transitions from one language to another at specific points during the conversation. Code switches aren't random; their occurrence is strategic and predictable and can include one word or a string of words. One expression is the base language and a second one is introduced.	Base language: *Spanish* Spanish noun: *Palabra* English phrase: *What is it?* Spanglish question: *La palabra, what is it?*
Calques	In calques, "the syntactic structure of one language is mapped on to the other" (Sayer 2008, p. 97).	English: *To have a good time.* Spanish: *Pasarla bien.* Spanglish: *Tener un buen tiempo.* Here, the English phrase "to have a good time" is translated into Spanish, following the English syntactic structure.
Spanish infinitives have three different endings: *ar* (e.g,. *mirar/to watch*); *er* (e.g,. *comer/to eat*); and *ir* (e.g., *reir/to laugh*). The most common Spanish verbs end in *ar* and "the majority of new verbs in Spanish and Spanglish share the particular ending *ear*" (Rothman and Rell, p. 52).		

FIGURE 2

The range of Spanglish (adapted from Sayer 2008).



language of science, aligning with Carr, Sexton, and Lagunoff's (2007) informal-to-formal instruction.

I implemented the activities in this article as part of a two-week unit on the chemistry of life. One of my objectives was to help my Spanglish-speaking students transition to using less of their primary social language (L1) and more of their L2 and academic language. Figure 2 displays the levels of language-mixing targeted in the lesson.

Target vocabulary can include

- Tier 1, or basic, words, such as *sugar* and *fat;*
- Tier 2 words, or common academic terms, such as *investigate* and *materials;* or
- Tier 3, or highly academic or content-specific, words, such as *polymer* and *nucleic acid.*

Addressing both language acquisition and content mastery, my objectives were:

1. Students identify the three types of biomolecules in their language of choice.
2. Students estimate the nutritional value of a variety of food products.
3. Students communicate their prior knowledge about biomolecules using science vocabulary within group and whole-group discussions (Tretter, Ardasheva, and Bookstrom 2014).
4. Students justify the importance of the three biomolecules in relation to cellular processes.
5. Students assess publications on nutritional products and determine their validity based on their biomolecular composition.

I implemented the lesson objectives with these steps:

Science content mastery.

It's important to integrate students' prior knowledge into classroom instruction (Quinn, Lee, and Valdés 2012; Dong 2013), and, for ELLs, Spanglish is often a part of their funds of knowledge (Gonzalez, Moll, and Amanti 2005). The *Next Generation Science Standards* (NGSS Lead States, p. 8) suggest five areas in which science teachers can assist ELLs in mastering both science content and language:

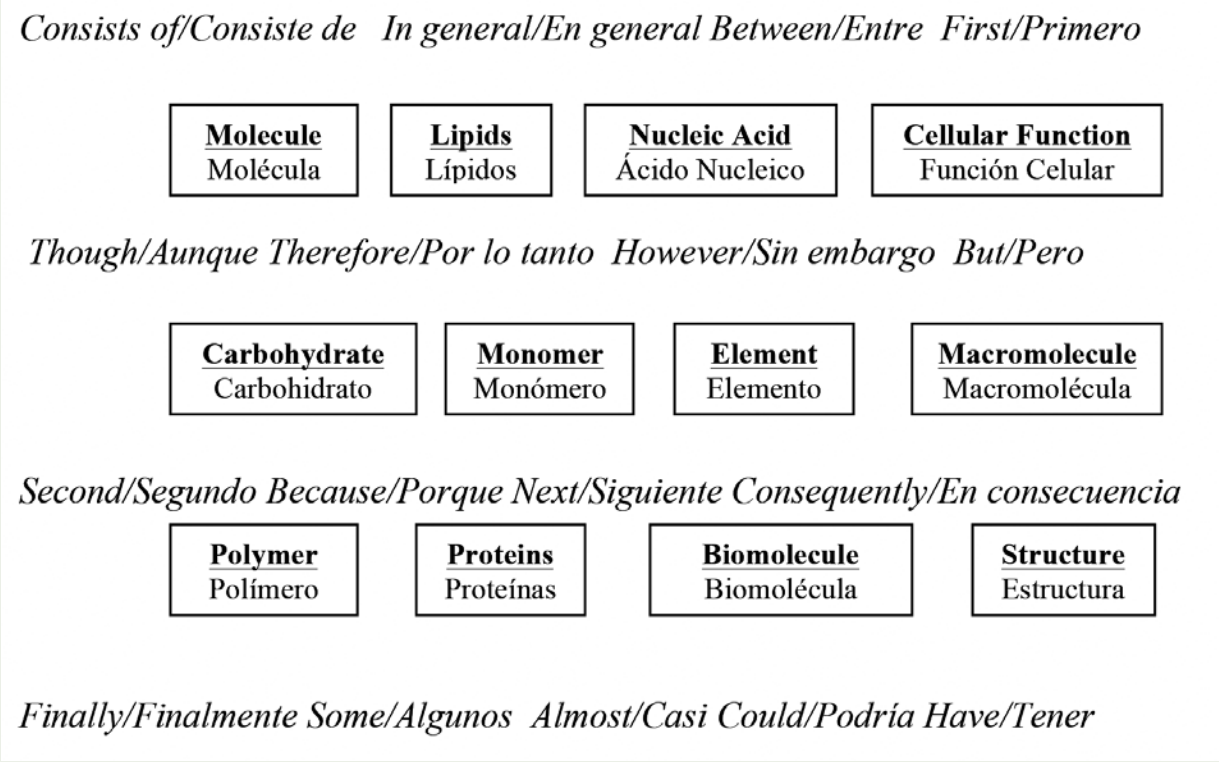
1. literacy strategies for all students
2. language support strategies with ELLs
3. discourse strategies with ELLs
4. home language support
5. home culture connections

Of these five areas, the last two clearly align with resources strategies like using Spanglish as a social language (NGSS Lead States 2013).

FIGURE 3

Brick and mortar words of the lesson.

The boxed terms are the "bricks" and the italicized words are the "mortar."



Step 1: Establish language proficiency

At the beginning of the lesson, I identified seven Spanglish-speaking students in my class in various phases of language acquisition, ranging from emerging to developing. Although these students' communication was comprehensible, they used restricted vocabulary, had limited command of language structure, and struggled to express their ideas in either English or Spanish. A few could use prior knowledge to construct meaning from a text.

For the first activity, Quick Write 1, I placed on a desk:

- an apple and a tortilla (carbohydrates),
- a can of refried beans (proteins),
- a bottle of cooking oil (lipids), and
- a DNA model (nucleic acids).

I set a timer for five minutes and asked students to write as much as they could about these objects, using their prior knowledge and language of choice.

For the second activity, What I Know, I gave students a vocabulary handout and instructed them to provide their thoughts and familiarity with each term (Figure 3). This established a baseline to monitor each student's progress throughout the lesson.

Step 2: Identify the target terminology

The Brick and Mortar strategy consists of low-frequency concept words that represent the bricks of a brick wall and function words that serve as the mortar that keeps the bricks together. Spanglish-speaking (and non–Spanglish speaking) students need to understand how to use both kinds of terms to articulate their thoughts. Figure 3 shows the brick and mortar words that students used in this lesson.

To attain this objective, the teacher models the use of both brick and mortar terms and then student pairs practice using the target terminology. The teacher can decide on the focus of the vocabulary usage. For example, students can practice reading, writing, and speaking about procedural knowledge to prepare for an upcoming lab report. At this stage, students' reports (written and oral) may include a confluence of Spanish and English.

Connecting to the *Next Generation Science Standards* (NGSS Lead States 2013).

Standard
HS-LS1 From Molecules to Organisms: Structure and Processes

Performance Expectation
The chart below makes one set of connections between the instruction outlined in this article and the *NGSS*. Other valid connections are likely; however, space restrictions prevent us from listing all possibilities. The materials/lessons/activities outlined in this article are just one step toward reaching the performance expectation below.

HS-LS1-6. Construct and revise an explanation based on evidence for how carbon, hydrogen, and oxygen from sugar molecules may combine with other elements to form amino acids and/or other large carbon-based molecules.

Dimension	Name and *NGSS* code/citation	Connections to classroom activities
Science and Engineering Practice	**Constructing Explanations and Designing Solutions** • Construct and revise an explanation based on valid and reliable evidence obtained from a variety of sources (including students' own investigations, models, theories, simulations, peer review).	Students work on their Quick-Write 2 based on the Science in the News information to justify the importance of the three biomolecules in relation to cellular processes.
Disciplinary Core Idea	**LS1C: Organization for Matter and Energy Flow in Organisms** • The sugar molecules thus formed [from photosynthesis] contain carbon, hydrogen, and oxygen: Their hydrocarbon backbones are used to make amino acids and other carbon-based molecules that can be assembled into larger molecules (such as proteins or DNA), used for example to form new cells. • As matter and energy flow through different organization levels of living systems, chemical elements are recombined in different ways to form different products. (HS-LS1-6)	In their Quick-Write 1 and prompted by food item examples, students communicate their prior knowledge about biomolecules. In their 20-word summary of the Science in the News publication, students address the validity of the article in its portrayal of biomolecules.
Crosscutting Concept	**Energy and Matter** • Changes of energy and matter in a system can be described in terms of energy and matter flows into, out of, and within that system. (HS-LS1-6)	Using the Quick-Write 1 and 2, and the written reports on the Science in the News assignment, students estimate the nutritional value of food products examined in class.

The following activities meet the objective for this portion of the lesson:

- Science in the News activity: To further their understanding of brick and mortar terms, students search for periodicals and online resources focused on biomolecules. Examples include articles or advertisements about nutritional supplements, energy enhancers, and medicine.
- Quick Write 2: Students revise their initial writings from the Quick-Write 1 activity. The teacher encourages them to replace as many Spanish terms as they can with L2 and scientific language, using the terminology that they identified in the Science in the News activity, and challenges them to use at least five brick words in their revisions.
- Enrichment activities (optional): Students write

20-word summaries—in English—addressing the validity of one publication's portrayal of biomolecules. Later, either with groups or with the whole class, students share the number of brick and mortar terms they used in the Quick-Write 2 and the enrichment activities.

- Cloze Passage: Students read a passage in which some words are replaced with blanks and then fill in the blanks appropriately. This group activity assesses student recall and understanding of content-specific vocabulary.

Students may rely on a mix of L1 and L2 to complete the above activities. Teachers who aren't fluent in Spanish can seek assistance from English as a Second Language (ESL) coaches, bilingual colleagues, or student helpers.

Step 3: Establish a language-mixing level

Based on the information gathered in step 1, teachers can propose the level of language-mixing they want students to achieve by the end of the lesson. As shown in the highlighted area in Figure 2 (p. 32), in this lesson, my Spanglish-speaking students moved from using only Spanglish to using a substantial amount of English and a limited amount of Spanish.

Assessment

Using Spanglish as a teaching and learning resource—especially at the beginning of the lesson—gave me a glimpse into students' language production and helped students transition into L2 and the language of science. Most of the Spanglish speakers used the target language (L2 and scientific terminology) in different activities embedded in the lesson.

Five of my seven Spanglish speakers transitioned from using Spanglish as their primary language to using English with some Spanish influence. The other two students were not far behind; their progress showed growth, but they did require further intervention. The results were particularly evident when comparing the Spanglish speakers' Quick-Write tasks. Their development expanded from relying heavily on their primary social language to being able to write and speak in English, while using science terminology.

Conclusion

Even though Spanglish sometimes carries negative connotations, teachers can use it appropriately to develop ELLs' academic language proficiency. Incorporating Spanglish as an instructional and learning resource, I observed in students not proficient in L1 and L2 a profound self-assurance and interest. Their self-confidence was evident as they developed their L2 and science knowledge. I witnessed this not only in their interactions with the content but also in their engagement with peers.

I based these activities on Gallard's (1992) view of a context-embedded classroom, in which students view and learn science through conceptual understanding and not by their expertise in content vocabulary. This ideal drove our use of Spanglish in the classroom, which, in turn, provided students with a sense of comfort in which they make connections between their prior understandings and new knowledge. Students progressed through the lesson by applying their primary social language for the purpose of mastering their L2 and science-content language. ■

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