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No “Pobrecito Student”: Translanguaging High-School Science for Academic Language Development

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NO “POBRECITO STUDENT”: TRANSLANGUAGING HIGH-SCHOOL SCIENCE
FOR ACADEMIC LANGUAGE DEVELOPMENT

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A capstone thesis submitted in partial fulfillment of the requirements for the degree of
Master of Arts in Teaching

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DEDICATION

A mamá, papá y Flor por ser mi guía, mi soporte, y el amor mas inmenso que conozco. Thank you Thomas, for being my love and my home. To all the students who were ever in my classrooms— gracias for letting me be your teacher and learn with you; this research was only possible because all of you were in my life. To Terry and Diane for the many Teacher Conversations in our car rides. Thank you Griselda Beacon for being my professor, my mentor, and my friend.

Para mis ángeles que me cuidan desde el cielo.

“Nosso papel não é falar ao povo sobre nossa visão de mundo, ou tentar impô-la a ele,
mas dialogar com ele sobre a sua e a nossa.”
- Paulo Freire, Pedagogia do Oprimido

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CHAPTER ONE

Introduction

Overview

The role of the English as a Second Language (ESL), dual-immersion, or bilingual teachers is significantly different from the role I used to enact as an English as a Foreign Language (EFL) teacher in Argentina. Not only did I not have the pressures of having to prepare students for standardized state-wide testing that impact their continuity in the ESL program, but also I did not have to navigate the tensions and challenges of teaching learners in an environment where most of their peers are native-English speakers (García, 2009). English Language Learners (ELLs), those whose home language is other than English, continue to be among the fastest-growing and most vulnerable populations in U.S. schools (Huerta & Garza, 2019). Many ELLs come from very diverse backgrounds culturally and linguistically. For this reason, they are also known as Multilingual Learners (MLs) - in this Capstone, both terms will be used interchangeably. I realized, then, that ESL teachers' role demands that they become active researchers in their practice and that they critically select strategies, models, and frameworks for teaching that seek to leverage learners' development of knowledge and skills. From an academic perspective, the literature reflects the deficit view teachers have with regard to ELLs. This view informs and permeates teachers' practices and behaviors in ways that may hinder learning (Zwiers, 2007). In multilingual environments like the one studied in

this research, ESL teachers have to respond to the needs of their learners in ways that integrate language and school cultural practices. These settings often have ELLs in mainstream content classes where the teacher does not necessarily recognize their needs and may engage in obstructing learning practices (Zwiers, 2007).

During my time teaching academic reading to ELLs at a district school in urban Minnesota, I observed that, as research suggests, academic language development is understood as learning vocabulary (Townsend, Brock, & Morrison, 2018; Zwiers, 2007). Research also supports the idea that ELLs find it challenging to develop agency, especially in content classes like science (O'Connor, 2015). When considering the identity piece, I realized that most practices I had seen did not acknowledge students' cultural and linguistic backgrounds. On the other hand, in terms of academic language, I became particularly interested in identifying practices that would allow high-achieving students with advanced English proficiency levels to develop a more masterful command of the language in academic texts discussing scientific content.

English Language Learners: A Multilingual Perspective and the Need for *Change*

As a teacher in training in Hamline University's ESL licensure program in Saint Paul, Minnesota, I very quickly became aware of the frequent struggles students learning English at schools face daily. Social and cultural difficulties in adjustment and concerns over their current legal status in the country or their financial struggles often harm these learners, who are viewed from a deficit perspective (Calderón et al., 2020). This bias plays a crucial role in the decisions made by teachers when they plan and when they teach. When teachers prepare their lessons focusing on what ELLs lack, they *water down*

the learning experience (Calderón et al., 2020). In doing so, they seek to prevent this already vulnerable population from undergoing more challenges. As a language learner myself, however, I knew from the onset this reasoning was flawed.

Diverse literature and a lifetime of personal and professional experiences validate the idea that ELLs, further from having a limited experience with the languages they know, have more opportunities for spontaneous metalinguistic reflection (García, 2009). They engage in a complex and abstract thinking process when negotiating meanings in different contexts, the two most common being home and school. ELLs are born translators and cultural negotiators (McKinney & Tyler, 2018). They traverse the obscurities of language and meaning, serving themselves from all semiotic structures available to them – this is their inborn talent. When learning together as a community, these learners enact their usual roles and usually engage in teaching roles motivated by the need to grow together.

It was, therefore, disheartening to learn first-hand that ELLs frequently struggle and underperform in content areas and that the culprit is academic language. I immediately started thinking about the reasons why this was the case. As I considered the multiple causes that could underlie this case, three questions emerged: Why do ELLs find it challenging to develop academic language when they can reflect upon languages and do so daily? What do learners need in order to develop academic language skills? Is the academic language in itself the culprit for lack of proficiency? These questions guided me in the development of possible hypotheses that could be tested in a study. Some initial ideas included the following: (1) academic language is, in fact, the culprit for its level of

complexity and abstraction; (2) academic language development requires that ELLs work more on language and grammar; (3) academic language development in ELLs requires explicit instruction; (4) academic language development requires that ELLs become more active users of language; (5) academic language development requires some degree of success in writing or speaking.

Out of all the initial hypotheses, those on instruction and learners' agency were the most interesting to me for further research. At this point, it became clear that the development of academic language in high school ELLs implies shifting from a focus of language as an object to language as performance. I was fortunate to find a theory of language learning and development that recognizes and promotes this shift—translanguaging. As a framework for learning, translanguaging engages students in a process of inquiry and research that is based in their background cultures and previous knowledge and that ideally will have an impact on the community around them (García, Ibarra-Johnson, & Seltzer, 2017).

From its etymology to its understanding of language and learning, translanguaging embodies the fluid, dynamic nature of the multilingual brain. At the 2019 MELEd Conference, I attended Ofelia García's keynote on translanguaging and realized that it explained what my experience was learning a second (and third) language. It made sense. It was how it felt, and still feels like when I discover more about the languages I speak: all that knowledge contributes to the same background or 'corriente' as García, Johnson, and Seltzer (2017) explained. For this reason, MLs' background language knowledge could act as a *pillar* for them to lean on when they build their speech or as a

springboard for them to go beyond their current level of language. At the same time, viewing learners' home languages as background knowledge could contribute to shifting from a deficit-based approach to an asset-based approach and, in doing so, attain the much-needed *change* in terms of equity, diversity, and inclusion in schools.

Academic Language Development in ELLs: Not a Race-Neutral, Apolitical Activity

The role learners' home language play in developing other languages is now at the core of most ESL debates. Translanguaging supporters see its potential in language development but also value cultural responsiveness in this approach. On the other hand, detractors discourage the language practices associated with it and instead support additive or subtractive views of bilingualism. They also raise concerns about the fact that translanguaging practices could promote the stigmatization of the ELL population. However, this often comes at the expense of learners' identity. Failing to develop a command of English could hinder learners' involvement in social life, but rejecting their home languages could create a void between them and their families (Calderón et al., 2020; MacSwan, 2017). Navigating the intricacies of such a dilemma to find an approach that will honor students' singularities in pluralities is a highly ideological practice. It demands that teachers stand for social justice and equity in education (Calderón et al., 2020; García, Ibarra-Johnson, & Seltzer, 2017).

A preliminary review of the literature suggests that bi-/multilingual students cannot and should not silence any of their languages; on the contrary, they should be encouraged to develop them as much as they can. However, several questions immediately arise: How could teachers promote multilingualism in the classroom to build

an environment conducive to learning languages? This question made me ponder further on whether embracing multilingualism in academic settings had the potential to impact science content teaching and learning.

Schools could approach cultural and linguistic diversity from a multilingual perspective of translanguaging. This view posits that bilinguals and monolinguals have one linguistic repertoire, but bilinguals have a diverse mental grammar (MacSwan, 2017). In line with this, it is worth asking the following: How could translanguaging contribute to the development of multilingualism in the classroom effectively? What are the challenges teachers face in implementing translanguaging in highly culturally and linguistically diverse classrooms?

Teaching and Learning How to Explain Scientific Content in a Multilingual Environment

This research explores how teachers can promote pathways to autonomy, agency, and ownership in the learning experience of MLs while acknowledging and valuing learners' cultural and linguistic knowledge. Furthermore, it seeks to question what scientific content in high school is and what it demands from ELLs to fully understand it, transfer it onto different situations, and explain these. In this process, the study explores how teachers can promote metalinguistic reflection among students to leverage their language production when discussing scientific topics. The study closely examines the linguistic function of explaining and the language and discourse features associated with it. Assessments incorporate the *Claim, Evidence, and Reasoning* (CER) model to scaffold writing.

Ultimately, the present study challenges the idea that a culturally responsive approach to languages such as translanguaging causes stigma and stratification by exploring its potential in developing learners' voices, sense of agency, and overall linguistic identities. The following research questions guide this study: *What are the impacts translanguaging has on academic language development when teaching and learning science content in multilingual classrooms? What are the challenges and successes teachers face when implementing translanguaging in these classrooms?*

Summary

This chapter discussed the questions and concerns emerging from my experiences with and observations of ELLs in U.S. high schools. When reflecting upon those questions, it became evident that a deficit view of these learners is still very much prevalent in U.S. classrooms. Content classes, such as science, challenge ELLs in ways that make them continue to fall behind their non-ELL peers - this calls for a necessary change.

The next chapter reviews relevant literature that addresses the elements in the research questions in the light of the following major themes: academic language in the science classroom, teaching and instruction of scientific content, and translanguaging. Preliminary research suggests that the translanguaging approach to language teaching and learning could positively impact academic language development while promoting a multilingual environment.

The following chapters go over the methodology, data collection and analysis, and lastly, my conclusions and recommendations for future research. Chapter 2 reviews the

research around the development of academic language in scientific contexts and, also, the research around translanguaging in different classrooms. Chapter 3 describes the research methodology and tools that are used in the data collection. The research tools include the plan of a unit of work that links Genre Theory, the Teaching and Learning Cycle, and Translanguaging frameworks, as well as the formative and summative assessments implemented in the unit with their corresponding rubrics. Chapter 4 presents the quantitative and qualitative collection and analysis of data. Lastly, chapter 5 reveals the six major learnings from this study, as well as, the implications, limitations, and areas for further research.

CHAPTER TWO

Literature Review

Overview

Since this study explores whether translanguaging can impact academic language development in diverse contexts, the following review of relevant literature in the field critically defines and examines what academic language is and how it is understood by ESL and mainstream teachers when teaching science content. It also explores multilingual learners' perceptions and understandings of academic language and the attitudes related to its use to explain scientific knowledge. The literature, then, reveals that academic language development and cultural and linguistic diversity are often approached and experienced as fragmentation by both teachers and learners. This fragmentation frequently leads to deficit views of what ELLs can do and express with language. At the same time, it hinders their access and expression of complex, abstract concepts such as those discussed in a science class. The review later identifies and analyzes teachers' roles when developing understanding or expression of scientific knowledge. Lastly, translanguaging is analyzed as a theory of language and a learning theory while examining the challenges and concerns of using this approach for teaching. The main purpose will then be to answer the research questions: *What are the impacts translanguaging strategies can have on academic language development when teaching and learning science content in multilingual classrooms? What are the challenges and successes teachers face when implementing translanguaging in these classrooms?*

Academic Language in the Science Classroom

The first section in this review aims at defining, describing, and exploring what academic language is and what it takes for a multilingual learner to be an active participant in a science lesson. What do multilingual learners need to know in terms of language and linguistic cues to understand scientific content? What do they need to know about grammar and lexis, discourse, and phonology to be active participants in the classroom? What are the linguistic and content standards that learners need to achieve to consider themselves knowledgeable? What are some linguistic and communicative performances intrinsic to the science classroom, understanding the content, and the ability to make claims? These are the main questions addressed in this section. One of the challenges identified in the teaching of science to multilingual learners is that teachers frequently believe that objectives for content and language are and ought to be separate (Seah & Silver, 2020). At the same time, field-specific content presents challenges in terms of the language required to understand it. Very often, this content is challenging because it offers learners with distinctive language features (e.g., technicality, abstraction), varied linguistic resources (e.g., specialist vocabulary, nominalizations), strategies (e.g., analogy), and discourse features (e.g., various science genres and classroom interaction patterns) (Fang, 2005; Halliday, 2004; Lemke, 1990, as cited in Seah & Silver, 2018). This section explores how science teaching to multilingual learners has facilitated or hindered MLs' academic language development.

The research by Zwiers (2007) systematized the definition of academic language in three different constructs that are agreed upon by most researchers: (a) academic

language as an evolving set of lexical, syntactic, and discourse elements used to describe abstract concepts and complex thinking (Chamot & O'Malley, 1994 as cited in Zwiers, 2007); (b) academic language as a linguistic skill to explore new meanings of familiar vocabulary in different ways to understand better and communicate new knowledge (Dutro & Moran 2003 as cited in Zwiers, 2007); and (c) academic language as a variable object that changes according to content areas, classrooms, and materials (Scarcella 2003; Valdés 2001 as cited in Zwiers, 2007). In light of these definitions, researchers argue there is not enough research on the interplay of content learning and language development in English learners (August & Hakuta, 1997, as cited in Zwiers, 2007). Furthermore, Zwiers (2007), as well as Seah and Silver (2020), also challenged the notion upheld by most teachers and researchers who understand academic language as content vocabulary (e.g., *photosynthesis*). Moreover, attaining proficiency in understanding, analyzing, and producing knowledge is bound by the learner's "academic capital" (Zwiers, 2007, p.96). The latter consists of social, cultural, and linguistic knowledge often unknowingly used by students to achieve or exceed school expectations (Zwiers, 2007).

What are the linguistic demands of a science lesson in terms of understanding? What are the linguistic requirements of a science lesson in terms of expression? What do students need to know or develop to own their experience learning science? This section explores the most salient dimensions the literature reveals to be the ones that present the most challenges in multilingual classrooms and the most opportunities for academic language development when teaching and learning science. Two recurring themes

concerning academic language development for English learners are language learning as a fragmented experience and diversity as an opportunity that presents several challenges.

Multilingual Learners in the Science Classroom

Multilingual Learners' (ML) experiences learning science are widely portrayed as disjointed or fragmented as certain practices employed with these learners often go unchallenged. Studies show how, despite their multicultural backgrounds, MLs inhabit monolingual English spaces (Vaish, Jamaludeen, & Roslan, 2009, as cited in Seah & Silver, 2020). In these spaces, learners are identified as English Language Learners (ELLs) (García & Sylvan, 2011). These learners frequently employ linguistic varieties such as 'Singlish' (Seah & Silver, 2020), 'Spanglish' (García, Johnson, & Seltzer, 2017), or 'New Chinglish' (Li, 2018). According to educational policymakers, these varieties are not appropriate for their use in academic settings (see, e.g., Silver, 2005, as cited in Seah & Silver, 2018). Moreover, these learners often find themselves in spaces where English is the dominant language to teach content such as science, despite learners' potential language and literacy problems (Poza, 2014; Seah & Silver, 2020; Townsend, Brock, & Morrison, 2018). Therefore, MLs' understanding of what a science class is and what it entails has to do with the representations they are exposed to in their learning experiences.

On the other hand, diversity is also one of the most recurring themes in the literature that explores and characterizes MLs/ELLs. Moreover, research also shows that the fastest-growing student population in the United States is that of ELLs. This population may grow to 40% of the total U.S. population by 2050 (Goldenberg, 2008, as

cited in Huerta & Garza, 2019, p. 534). However, this population is also characterized by the challenges they face academically, specifically in content areas like science, in which they fall behind their native English-speaking peers (Huerta & Garza, 2019). On the other hand, diversity appears as *multilevel* and *multilayered*. There is, therefore, diversity in MLs' learning styles and strategies and their cultures and languages.

A study by Townsend, Brock, and Morrison (2018) analyzes qualitative data that show how a teacher addresses cultural and linguistic diversity in the classroom in a multimodal way. Multimodality involves processes of *critique*, *transformation*, *transduction*, and *framing*. Findings show that participants value repetition (understood as a *critique*) in the teacher's instruction, which means a more robust and deeper understanding of concepts. Moreover, findings show the teacher actively engages students' interest by incorporating technology and, in doing so, facilitating opportunities of *transformation* (exploring different explanations and concepts) and *transduction* (use of knowledge in other contexts) which students enjoy and find relevant for their practice. Lastly, data show that holding students accountable for their learning by requiring them to revisit vocabulary or by binding lessons in particular ways (such as "I can" statements) is valued by students and perceived by them as teachers' genuine interest in students' learning process. These three main themes, then, illuminate how learners could overcome fragmentation.

Diversity, too, although recognized as a critical component in MLs' learning process, seems to be presented in fragments or units. This view of language does not necessarily require learners to engage in complex, abstract, or pragmatic understandings

or uses of the language. Hinkel (2014) stated that the role of culture is central to the development of a second language in that learners cannot otherwise access it entirely. Thus, unless learners implement strategies and styles that are culturally appropriate, their pragmatic and linguistic choices when speaking or writing are limited (Byram & Morgan, 1994; Hinkel, 1999, as cited in Hinkel, 2014). At the same time, he noted that culture is also essential when considering the student and their background. Scollon and Scollon (2001, as cited in Hinkel, 2014) claimed that as a part of an individual's identity, culture cannot be separated from the process of learning. Learners' beliefs and expectations about their role and the teachers' vary across different cultures. Classroom experiences should, therefore, reflect these differences. Hinkel (2014) posited that L2 rhetorical features (logos, pathos, and ethos) pose more challenges for English learners when exploring this idea. Some of the American rhetorical tradition features include the placement of the thesis statement, paragraph structure, and rhetorical support for the thesis in every paragraph. Though ELLs often receive writing instruction via model paragraphs or essays (outcomes), they should instead focus on the reasons why they should structure their texts in a certain way (causes).

Similarly, when discussing the linguistic demands faced by ELs in content classes, Bunch (2014) stressed that there needs to be a shift in focus on the part of the teachers who, instead of focusing on what students *cannot* do with the language, should consider what they *can* do as well. When doing so, learners employ traditionally academic language and non-academic language resources available to them. When Bunch (2014) examined how students use language in an academic task, two forms of language

seem to be employed: the *language of ideas* and the *language of display*. While the former refers to all linguistic and non-linguistic resources used by learners when completing an academic task, the latter “[...] refers to the evolving oral and written texts students develop, either individually or as a group, to present to particular academic audiences” (p. 74). Hence, academic language development should be viewed as a multidimensional process that integrates meaning, language, and use. In this process, students decide phrasing, register, and resources they will employ to structure discourse.

Seah and Silver (2020) studied the linguistic demands in science learning. They noticed the fragmentation experienced by MLs as teachers failed to challenge the belief that content and language objectives should be separate (Huttner, Dalton-Puffer, & Smit, 2013; Tan, 2011, as cited in Seah & Silver, 2020, p. 2454). For this reason, researchers sought to demonstrate that one way in which teachers could approach the demands entailed in a multilingual class was by having learners engage in language/literacy opportunities along with field-specific content. They studied three secondary school teachers and their teaching of the Human Circulatory System (HCS) to Grade 9 students. These were primarily Chinese, Malay, and Indian students who took classes in which English was the medium of instruction in all of them except for the course Mother Tongue (i.e., Chinese, Malay, Tamil). Findings showed that all three teachers in the study provided language support through the introduction, use, retention, and rationalization of new terminology. Researchers suggested that in science education specifically, language plays an intricate role in the learning process of multilingual learners since they require knowledge of specific terminology, understanding of how such terminology connects

with scientific concepts and understanding how to use those appropriately in written or spoken discourse.

Although Seah and Silver (2020) were able to identify these needs on the part of the learner, their study focused solely on teacher instruction to navigate and address the linguistic demands in the classroom. The study also showed that two of the three teachers focused on language at the word-level, and only one focused on language at the sentence-level. The latter was also the only teacher who made students' language visible by doing error analysis. These practices perpetuate the idea that academic language development is simply learning new vocabulary (Zwiers, 2007). Doing so furthers the fragmentation ELs experience by presenting language as separate entities (word, sentence, and discourse levels). At the same time, the separation between content and language does not seem to be overcome either (Ardasheva, Norton-Meier, & Hand, 2015; Zwiers, 2007).

While Seah and Silver (2020) acknowledged the implications of having diverse, multilingual groups of students, they failed to assess how these students could contribute to language development in the science classroom. Similarly, Townsend, Brock, and Morrison (2018) recognized the value of multimodality in instruction. However, they focused almost exclusively on vocabulary (word-level). The two measures of academic language proficiency used in the study measured academic language growth in terms of lexis. Furthermore, while participants showed language growth, data did not explore why or how this growth had occurred nor whether learners retained recently acquired language and structures over time.

It is crucial to explore other forms of approaching diversity in the classroom to leverage learners' comprehension of content and their production of new knowledge. At the same time, learners need to view language as a whole instead of fragments or separate units that do not necessarily promote the most accurate structuring of discourse.

Teaching and Instruction of Scientific Content

Teachers and their approach to developing academic language through scientific content directly impact learners' experience. Their practices and behavior could either hinder or promote learning and development (Zwiers, 2007). For this reason, it is necessary to closely examine the most effective and, also, the most challenging practices when promoting both understanding and expression of scientific content. In this regard, it could be suggested that, in the context of content lessons, there are three main views of teaching and instruction: (a) as creating conditions for learning science (Ardasheva, Norton-Meier, & Hand, 2015); (b) as planning for academic language development (Huerta & Spies, 2016; Huerta & Garza, 2019); and (c) as fostering the science learner identity (O'Connor, 2015). These categories then help shape and reshape teachers' views of how the overall process should look like when working towards two main aims: understanding and expression of content and knowledge.

Teaching and developing language and content simultaneously is a complex process because learners have to pay attention to both at the same time. On the other hand, teachers are in charge of facilitating an effective integration of content and language, leading to an improved and increased linguistic repertoire. Ardasheva, Norton-Meier, and Hand (2015) identified key learning processes and classroom

structures to create an environment conducive to scientific learning. Researchers drew from Norris and Phillips (2003, as cited in Ardasheva, Norton-Meier, & Hand, 2015) and restated that science is impossible without language. Ardasheva, Norton-Meier, and Hand (2015) made a distinction between the language used to deepen understanding (*learning through the language of science*) and the language students learn to attach their experiences to it (*learning about the language of science*). They also pointed out that students gain a deeper understanding by integrating science concepts and personal experiences (*living the language of science*). According to the study, three classroom structures support these processes: a *collective zone of proximal development* (Vygotsky, 1978, as cited in Ardasheva, Norton-Meier, & Hand, 2015), *symmetric power and trust relationships* (Moll & Whitmore, 1996 as cited in Ardasheva, Norton-Meier, & Hand, 2015), and the *teacher as decision-maker* (Whitmore et al., 2005, p. 319 as cited in Ardasheva, Norton-Meier, & Hand, 2015). Both processes and structures contribute to creating an environment with students at the center and teachers' capitalizing on learners' previous knowledge and skills in the personal and social negotiation of meaning.

When planning for the development of academic language, Huerta and Spies (2016) suggested that engaging young ELLs in science inquiry and writing integrated lessons build on their conceptual understanding and academic vocabulary. Moreover, the 5-E model of science inquiry (engage, explore, explain, elaborate, and evaluate) allowed them to craft objectives that reflected both Next Generation Standards (NGSS Lead States, 2013) and Common Core State Standards (National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010). They also integrated

writing practices to scaffold ELLs' academic language and conceptual understanding. However, in his study of Mexican-American students of low-income backgrounds in Arizona, O'Connor (2015) showed that it is essential for teachers to foster learners' scientific identities to make expert claims. This study also shows that as students engage and socialize in new discourse patterns, fluid forms of expertise emerge. Yet, these forms are not enough for students to make knowledge claims or to claim authority in scientific conversations. For this reason, it is necessary to articulate knowledge of language with understanding.

Developing Understanding of Scientific Content

Another critical piece that emerges from the literature as an indispensable element in the development of academic language is *understanding* (Ardasheva, Norton-Meier & Hand, 2015; Huerta & Garza, 2019; Zwiers, 2007). Learners themselves identify the need for vocabulary practice and record to *know* what they have learned (Townsend, Brock, & Morrison, 2018, p. 337). In this process, though, research indicates certain practices may facilitate or hinder understanding (Zwiers, 2007). The studies reviewed in this section explore ways in which teachers can foster understanding of content. In this regard, writing-to-learn theories and their potential in promoting understanding via structured discourse appear as best practices for teaching writing.

On the other hand, learners can develop comprehension in socialization and social interaction in three different ways: negotiation, embeddedness, and non-threatening learning environments (Ardasheva, Norton-Meier, & Hand, 2015). The studies reviewed in this section, then, while continuing to shed light on the components of academic

language development by extrapolating effective practices for building understanding, seem to fail to address and incorporate the culture of the learners into the classroom. In other cases, such incorporation is strongly discouraged, particularly when students' cultural backgrounds come in the form of their home language (Zwiers, 2007). Cultural features and references in the target language (English) are also highly discouraged. Idiomatic expressions and cultural references could obscure meaning in content areas such as science (Zwiers, 2007). Consequently, it raises questions about the role culture should play in the learning process of bi/multilingual learners and whether it can be at all discouraged or avoided.

In his study on the development of academic language in mainstream content classes, Zwiers (2007) examined field notes, transcripts, and the work of middle-school intermediate-level English learners. Findings in Zwiers (2007) showed that learners used academic thinking skills in all content areas (high-order thinking skills). The prevalent forms are *cause/effect*, *comparison*, *persuasion*, *interpretation*, and *perspective*. These categories generally follow a natural sequential order with *cause/effect* on the concrete end and *interpretation or perspective* on the abstract one. Findings show that teachers engage ELLs more in *cause/effect* or *comparison* than in more complex ways of thinking. According to the study, teachers and their behaviors play a role in learners' understanding and linguistic development. According to the research, five discourse patterns could either foster or impede academic language development: questioning, elaborations, modeling and practice, analogies, and personifying and linguistic enabling. This study also observes that social and cultural factors could impact development as well. When

considering patterns that specifically tackle understanding, analogies and personifying seem to be the most effective. When teachers use analogies, they can clarify complex concepts by connecting them to students' experiences.

Moreover, personifying facilitates understanding the language and ideas of the lesson when performed by both teachers and learners who build cognitive skills while developing understanding. The use of metaphors or idiomatic expressions during explicit content instruction could obscure meaning and hinder development. These language uses pose an additional challenge to learners who, when confronted with phrases like *to be on the right track*, have to understand the literal and figurative meanings of the phrase while trying to grasp the new concepts (Zwiers, 2007).

Writing-to-learn theories also foster understanding as they provide opportunities for learners to structure discourse and reflect their content and linguistic understandings. In a 20-year systematic review of the literature on writing in science interventions, Huerta and Garza (2019) demonstrated how writing-to-learn theories are a form of building conceptual understanding since writing reflects what students know and understand. They noted that while both ELL and non-ELL literature center around writing interventions, writing interventions in the ELL literature acknowledge (a) national standards, (b) the need for language and content integration, and (c) the need for ELLs to transition from explicit instruction to learner-initiated scientific exploration. Thus, researchers also noted how the ELL literature makes a distinction between conceptual understanding and linguistic skills. This distinction allows teachers to understand better the needs tied to understanding and skills development and plan accordingly.

Lastly, social interactions also appear to be crucial in developing understanding among ELLs in science classes. Social interactions, like negotiation and contestation, are inherent to scientific inquiry (Ardasheva, Norton-Meier & Hand, 2015; O'Connor, 2015). Researchers Ardasheva, Norton-Meier and Hand (2015) noted that these provide opportunities for collective construction and critique of knowledge. Negotiation, in particular, allows learners to integrate their multiple codes and source of knowledge to navigate the requirements of constructing knowledge privately and publicly. Therefore, negotiation is fundamental in the practice of scientific inquiry; scientific language and concepts are lived through negotiation (questioning techniques, high-frequency linguistic input or output, etc.). However, learners cannot attain negotiation or embeddedness in a threatening environment (Ardasheva, Norton-Meier & Hand, 2015). Learners' full participation in inquiry processes heavily depends on their belief that their claims will be taken seriously (Ardasheva, Norton-Meier & Hand, 2015; O'Connor, 2015).

Although building non-threatening environments by bringing learners' previous knowledge into the process of inquiry is vital, Zwiers (2007) raised some concerns about failing to correct students in an attempt to recognize and validate their home cultures which promote the development of a non-threatening environment. He stated that this might hinder academic language development as much as overcorrection would. Interestingly, he also noted that ELLs do not add to other people's points not because they lack academic language but because they are used to answering when they are sure they have guessed what the teacher wants them to say.

It is crucial, then, to explore how learners can bridge understanding and expression by developing a science identity (O'Connor, 2015) and, in doing so, gain a deeper understanding of the content through the expansion of their linguistic repertoire and their processes of inquiry.

Expressing Scientific Content and Thinking: *Claim, Evidence, and Reasoning*

The ultimate goal in working towards the development of academic language in the context of a science classroom is for students to develop critical thinking as well as linguistic skills they can later apply to the expression of scientific knowledge (Ardasheva, Norton-Meier, & Hand, 2015; Huerta & Garza, 2019; Huerta & Spies, 2016). Writing and argument-based science inquiry seem to be the basis of the discourse of science. Yet, the steps towards developing this discourse among ELLs do not appear in the Common Core State Standards (Huerta & Garza, 2019). This lack of directions in standards has a particularly negative effect on ELLs, who already are an extremely vulnerable population in science education (National Center for Educational Statistics [NCES], 2017, as cited in Huerta & Garza, 2019, p. 533). It could be argued that teachers should implement a framework that combines argument-based scientific inquiry (Ardasheva, Norton-Meier, & Hand, 2015) and academic language development through writing. Two models that emerge from the literature are the *5Es model* (science inquiry) (Huerta & Spies, 2016) and the *Claim, Evidence, and Reasoning* (CER) model (Gonzalez-Howard & McNeill, 2016; McNeill & Berland, 2017) for academic language development.

The development of interactions typical of scientific experts requires students to socialize in such discourse practices (O'Connor, 2015). Reversing the roles from novice

to expert between students and teachers by acknowledging and incorporating students' cultural expertise may boost their development of science personhood. At the same time, it may prompt students to refrain from using their home language if they perceive the teacher may find it improper (O'Connor, 2015). In hand with the identity piece, learners should develop argumentation skills (Ardasheva, Norton-Meier, & Hand, 2015).

Argumentation requires that learners share, evaluate, critique, and refine their tentative arguments through public debates (Walker et al., 2011, as cited in Ardasheva, Norton-Meier, & Hand, 2015). The predominant space for the integration of these areas is writing. Science notebooks are presented as spaces to record questions, investigations, procedures, reflections, and conclusions about their scientific observations (Huerta & Jackson 2010; Butler & Nesbit 2008; Nesbit et al., 2004, as cited in Huerta & Spies, 2016). These notebooks can provide sentence stems and other scaffolds for language development (e.g., Focus question, Prediction, Data collection, Claims and evidence, Conclusion) (Huerta & Spies, 2016).

Although the research community has not agreed upon one specific definition of "scientific argumentation" (Sandoval & Millwood, 2008, as cited in Gonzalez-Howard and McNeill, 2016), it is conceptualized by its structure and as a dialogic process (Howard & McNeill, 2016). The CER model is the structural framework of scientific argumentation (McNeill, Lizotte, Krajcik, & Marx, 2006, as cited in Howard & McNeill, 2016). In this model, the claim is a statement that answers an essential question, the evidence is the data that supports the claim, and reasoning is the explanation or logic underlying how the evidence supports the claim while referring to specific principles

(Howard & McNeill, 2016). This model, in turn, allows teachers to shift from a form of science instruction that focuses on memorization of isolated concepts, facts, and laws to one that engages students in meaning-making processes when addressing both content and language (McNeill & Berland, 2017).

This section focused mainly on describing how teachers can plan for academic language development and an identity that allows students to be *agents* rather than *patients* in their learning and classroom interactions. To do so, teachers should acknowledge learners' cultural diversity when planning for instruction, understanding, or expression. Teachers' instruction is, therefore, a vehicle for a scientific inquiry process in which students draw from a diversity of sources for understanding but also for expressing knowledge. The emergence of ELLs' home language is very likely to be expected. As a result, teachers should consider how students' home language and culture could facilitate or be a springboard for academic language development. In light of this, it would also be relevant to explore how teachers could incorporate ELLs' previous knowledge when learning about scientific topics.

Translanguaging

Translanguaging is the deployment of learners' entire linguistic repertoire, and not just the particular language(s) that are officially used for instructional purposes in that space (García, Johnson, & Seltzer, 2017). At the same time, translanguaging is also a theory of language with ingrained added value, which is fluid and dynamic (Wei, 2018). Conteh (2018) situated its origin in the Welsh bilingual education of the 1980s. A definition of translanguaging by Cen Williams said it is a cross-curricular strategy for the

“planned and systematic use of two languages for teaching and learning in the same lesson” (p. 3, as cited in Conteh, 2018, p. 445). It is the purpose of this section, then, to go beyond the definition of translanguaging to examine the different layers implied in its implementation in the English language learning classroom and the science classroom. This review will pay special attention to translanguaging at content, instruction, and production/expression levels. Last but not least, this section will shed light on the implementation of translanguaging to teach science, as well as on its challenges and opportunities for success,

Apart from being an ideological stance (García, 2009; Vogel & García, 2017; García, Johnson, & Seltzer, 2017; Li, 2018), translanguaging has also mainly been explored when used for teaching and learning in bilingual classrooms. Furthermore, translanguaging is also a theoretical lens to view bilingualism and multilingualism (e.g., García, 2009; García & O’Sylvan, 2011; García & Vogel, 2017; García, Johnson, & Seltzer, 2017; Li, 2018; Velasco & García, 2014). The review of significant literature on the study of translanguaging and its implementation to teach content and develop academic language suggests that its potential in education has to do with the fact that (a) it understands language as a space for creativity, (b) it understands language learning as the construction of linguistic identity, and (c) it understands the classroom environment as a space that is responsive to cultural and linguistic diversity (e.g., García, 2009; García & O’Sylvan, 2011; Velasco & García, 2014; Poza, 2014; García & Vogel, 2017; García, Johnson, & Seltzer, 2017; Li, 2018).

Theory of Language: Translanguaging as a Space for Linguistic Creativity

From a linguistic standpoint, translanguaging views and presents language as an ongoing and growing stream of linguistic knowledge (*corriente*) that is constantly shaped and reshaped by social and cultural factors and students' singularities (García, 2009; García & O'Sylvan, 2011). The translanguaging *corriente* encompasses all the knowledge of different named languages a learner may have developed in their brains according to their cultural experience. This view of language, in turn, focuses on the dynamism and progression of a learner's linguistic repertoire —*linguaging*. This view of language affords an understanding that contemplates speakers' individual use and the possibility of transformation or change (García, 2009; García & Vogel, 2017; García, Johnson, & Seltzer, 2017; Li, 2018). Researchers stress the importance of analyzing language for communication structurally and from the point of view of meaning and meaning-making (García, 2009; García & Vogel, 2017). Consequently, a significant theme extracted from the literature reviewed is that translanguaging views language and meaning as fluid (García, 2009; García & Vogel, 2017; García, Johnson, & Seltzer, 2017; Li, 2018). This means that meanings and also language continue to develop as a result of creative, sociocultural processes. The presence of fluidity raises questions about whether teachers should reflect this in their view of language and teaching approaches.

García and Vogel (2017) claimed that translanguaging as a theory of language privileges bilingual performances instead of monolingual ones. Although it does recognize the value and structure of named languages, it does not view them as separate canonical compartments but rather as horizontal continua of the learners' linguistic

repertoire. A dynamic view of language and learning challenges both subtractive and additive views of bilingualism. This view poses that there is only one language system that is ever-growing and changing. So are the language practices learners acquire; these are context-bound and are “multiple and ever adjusting to the multilingual multimodal terrain of the communicative act” (García, 2009, p. 53). However, not all language or language acquisition theories agree that there is growth when more than one language is brought into discussion and use in educational environments. The Separate Underlying Proficiency premise (Cummins, 1980, as cited in Vogel & García, 2017) suggests that since there is a limited capacity for language in the brain, promoting bilingualism limits the brain’s capacity as it has to share space. Thus, these learners are likely to be less proficient in each language. Another common misconception suggested that the growth of one language would “shrink” the proficiency of the other (Cummins, 1980, as cited in Vogel & García, 2017). These views fail to acknowledge the linguistic and pedagogical value of viewing students’ home language as previous knowledge.

Last but not least, the translanguaging approach to language teaching and learning entails fluidity in language. “Because it is always moving, the translanguaging corriente changes the static linguistic landscape that establishes limits on when one language or the other is used and transforms the traditional concept of ‘a language’” (García, Ibarra-Johnson, & Seltzer, 2017, p. 22). In this regard, Li (2018) suggested that translanguaging could be a theory of language practice. In this process, both students and teachers engage in the process of practice-theory-practice. Li (2018) centered the research around New Chinglish (Li, 2016a, as cited in Li, 2018, p. 11). This form consists of

English utterances and creations of words and expressions re-appropriated with entirely different meanings. It is also suggested that ‘there is no such thing as Language, only continual languaging, and activity of human beings in the world’ (Maturana & Varela, 1980, as cited in Li, 2018, p.16). At the same time, language should not be regarded as ‘an accomplished fact, as a thing made and finished, but as in the process of being made’ (p. 242, Ortega y Gasset, 1957 as cited in Li, 2018, p. 16). Translanguaging conveys two arguments, (1) MLs think multilingually as opposed to uni-lingually, and (2) human thinking goes beyond language, so humans draw from cognitive, semiotic, and modal resources to structure speech (Li, 2018). In this regard, communication is characterized by multimodality. For this reason, learners interpret and construe messages out of textual, aural, linguistic, spatial, and visual resources. When implemented effectively, translanguaging is a space where learners can integrate their formerly separated linguistic codes to go beyond them (Li, 2018).

Theory of Learning: Translanguaging as the Construction of Linguistic Identity

The dynamism that encompasses language in the translanguaging approach seems to be one that teachers should apply in the multilingual classroom. The multilingual and bilingual classrooms present challenges in learning content, meaning-making of abstract concepts, and reflecting knowledge in writing (García, 2009; Rowe, 2018). It is, therefore, important to discuss the role translanguaging can play in understanding content, instruction-based opportunities, and the production or expression of knowledge. In doing so, it is crucial to assess the impact of translanguaging on the language of *display* compared to the language of *ideas* (Bunch, 2014) and critically examine the fluid

nature of language. However, it is also imperative to assess MLs and their specific needs to promote the use of language in a way that adjusts to particular situations and genres. In this regard, there are two components in the translanguaging approach to teaching to address these needs, (a) a pedagogical framework for knowledge co-creation (García, Ibarra Johnson, & Seltzer, 2017), and (b) the recognition of learners' individuality in a collective experience (García & Sylvan, 2011). Thus, translanguaging appears as space for developing a linguistic identity that impacts MLs directly both as speakers and as members of society.

Translanguaging as a pedagogical stance builds on social justice and collaboration ethics to promote changes in society at large (García, Ibarra-Johnson, & Seltzer, 2017). For this reason, it upholds three core beliefs: (1) students' language practices and cultural understandings combine those brought from home and those acquired at school; (2) families and communities are a vital source of knowledge; and (3) the classroom is a democratic space and as such it challenges status quo to build a more just society (García, Ibarra-Johnson, & Seltzer, 2017). Moreover, translanguaging appears as a Third Space where students deepen understanding, co-construct meaning, and knowledge, and recognize opportunities and trajectories for growth (Martín-Beltrán, 2014). It could be suggested, then, that translanguaging appears as a culturally and linguistically responsive space.

From an instructional standpoint, translanguaging reflects its pedagogical stance in the instructional design cycle. This design model has five stages that seek to shed light on and analyze students' complex bilingual language practices: *explorar* (building and

expanding background knowledge on a topic), *evaluar* (assessing what you learn), *imaginar* (imagining what could exist), *presentar* (presenting what you have learned via different language practices), and *implementar* (demonstrating content and language knowledge; using language authentically) (García, Ibarra-Johnson, & Seltzer, 2017). These stages guide students through a process of inquiry-based language learning and development and aim at impacting learners and their communities (García, Ibarra-Johnson, & Seltzer, 2017). A translanguaging approach to teaching and learning, then, views students as agents of change and teachers as facilitators of a learning community that recognizes and values diversity.

A teacher who adopts a translanguaging stance engages in the process of inquiry themselves (García, 2009; García, Ibarra-Johnson, & Seltzer, 2017). Teachers, too, ask essential questions about their classes, identify and select designs, materials, and practices that best serve MLs' needs. In their study of the International High Schools, a U.S. secondary schools' network for immigrant newcomers, García and Sylvan (2011) closely examined the implementation, implications, and results of supporting plurilingual practices in instruction. Eight principles are at the center of the instructional design in these schools and may account, at least in part, for the success in their programs: (1) heterogeneity and singularities in plurality; (2) collaboration among students; (3) collaboration among teachers; (4) learner-centered classrooms; (4) language and content integration; (6) plurilingualism from the students up; (7) experiential learning; and (8) localized autonomy and responsibility (p. 393). Principles 1, 6, and 7, in particular, demonstrate that a heteroglossic approach such as translanguaging allows educators to

recognize students' differences in their language characteristics and use. At the same time, it prompts them to plan for the singularities in the pluralities.

Because it is a learner-centered approach with learners engaging in co-construction processes, a practical implementation of translanguaging does not require that all students and teachers speak the same languages (García, Ibarra-Johnson, & Seltzer, 2017; Rowe, 2018). Studies reviewed in this section provide evidence of significant differences in what translanguaging looks like in different classrooms. When analyzing the writing of young bilingual learners, Velasco and García (2014) claimed that bilingual learners use translanguaging in various stages of their writing process for multiple purposes. During the planning stage, data shows learners use their entire semiotic repertoire (linguistic and non-linguistic) and, in doing so, enact their pluriliteracies. In this stage, learners may use translanguaging for vocabulary acquisition and glosses as they annotate words they do not know on the margins.

Interestingly, data show how different translanguaging problem-solving strategies allow learners to build personal meaning during the drafting stage. Research shows that learners use language dynamically in sense and meaning-making. Therefore, during drafting, learners use translanguaging for word retrieval, word transformation, or code-meshing (Canagarajah, 2011). Last but not least, when developing their final products, learners will use translanguaging to engage their audience rhetorically and demonstrate the complexity of their repertoire (Velasco & García, 2014). In this way, learners develop agency and fulfill their desire for identity (Canagarajah, 2011).

The implementation and promotion of translanguaging strategies (code meshing) could lead to miscommunication and stigmatization. These occur when speakers cannot co-construct meaning correctly or have negative values attached to their language learning processes (Canagarajah, 2011; Poza, 2014). It is important to note that some studies have identified principles and strategies teachers and learners use to approach the difficulties that stem from co-constructing meaning and knowledge. In this regard, researchers found that in the effective implementation of the framework, (a) translanguaging practices are validated as such and enacted by teachers (Canagarajah, 2011; Rowe, 2018), (b) learners develop their voice and, in doing so, they develop their linguistic identity (Canagarajah, 2011), (c) learners are exposed to a variety of monolingual, bilingual, and multilingual sources (Rowe, 2018), (d) learners create a variety of monolingual, bilingual, and multilingual outcomes (Canagarajah, 2011; Velasco & García, 2014; Rowe, 2018), (e) learners implement negotiation strategies in their interactions to co-construct meaning and knowledge (Canagarajah, 2011; Velasco & García, 2014; Rowe, 2018; Karlsson, Larsson, & Jakobsson, 2019).

Language Development: Translanguaging in the Expression of Scientific Content

Although the implementation of translanguaging in the teaching and learning of science remains unexplored mainly, some researchers have observed and described learners' use of translanguaging strategies to learn about scientific concepts (Karlsson, Larsson, & Jakobsson, 2019; Poza, 2018; Ryu, 2019). These studies have revealed that when implementing translanguaging to the learning of scientific content (a) negotiation and interaction are entailed in tasks as well as exploratory talk and critique of the task

(McKinney & Tyler, 2018; Karlsson, Larsson, & Jakobsson, 2019), (b) learners engage in processes disinventing, (re)constituting, and trans-semiotising language (using more than one symbolic or linguistic code) (McKinney & Tyler, 2018) and meaning (Karlsson, Larsson, & Jakobsson, 2019), and (c) learners' need to make sense of the content which prompts them to make decisions about language and how to use it (Ryu, 2019).

There is a vast potential in translanguaging to approach the needs that emerge in science lessons in terms of understanding and the academic language and the expertise that learners need to develop to make claims. At the same time, since translanguaging emerges and has been primarily studied in bilingual classrooms, its potential effectiveness in a multilingual classroom needs to be further explored.

Research gap

A variety of research suggests that while curriculum and instruction should represent ML/ELL populations, there is a mismatch between what learners need to learn to develop academic language and what ESL and Mainstream teachers think they have to learn. When defining academic language, teachers often underscore the importance of discourse features such as coherence and cohesion or discourse markers, and, instead, center the definition of this term around vocabulary acquisition. This lack of work on speech features results in ELLs frequently feeling incompetent or unprepared to actively engage, for instance, in making claims when in a science class.

This literature review also explored the tenets of translanguaging as an approach to language and a framework for teaching. Findings revealed this approach acknowledges, validates, and honors learners' use of their linguistic and non-linguistic

repertoires at all times. However, they also suggested that learners may be skeptical about following this approach out of stigma or fear of teacher disapproval. On the other hand, teachers may find it challenging to implement translanguaging in culturally and linguistically diverse classrooms. Teachers seem to believe that translanguaging is only possible when both teachers and students are somewhat proficient in the languages spoken at school. This misconception stems, in part, from insufficient research in multilingual classrooms—especially that about academic language development—and from historical views of bilingualism in the United States .

When learning science, the development of academic language in ELLs demands that curriculum and instruction focus on recognizing, validating, and building over the learners' previous knowledge, whether content or linguistic. When implemented effectively, learners perform as agents rather than patients in their learning and acquisition processes. However, this redefines the role of the ESL teacher as well: they are no longer solely the language expert, but also, primarily, the facilitator of a multilingual experience in an academically and culturally diverse setting. ESL teachers who work with a focus on equity, justice, and inclusion should guide students in processes of inquiry and discovery in which students use their full range of *knowledge*. Students need to develop agency and expertise to develop the authority entailed in typical scientific claims. The following chapter will then integrate the concepts that emerged from the literature to address the following questions: *What are the impacts of translanguaging on academic language development when teaching and learning science*

content in multilingual classrooms? What are the challenges and successes teachers face when implementing translanguaging in these classrooms?

Summary

Chapter two reviewed the literature and research centered around academic language development in content areas—particularly, science—and the literature that centers on the observation of translanguaging in the classroom. The literature reveals the challenges and opportunities ELLs encounter when developing academic language in the classroom. Especially in the science classroom, the literature shows that negotiation and argumentation are crucial for learners to develop academic language in this area. However, the literature also reveals that ELLs frequently have less opportunities than their native-English speaking peers to develop language skills in science classes. This is because of the types of tasks and participation that are required of them in those classes. Translanguaging, thus, appears in the literature as a culturally responsive framework for teaching and learning that could leverage students' opportunities for academic language development.

Chapter three begins with a description of the study, the theoretical framework, and the research paradigm to guide this research. At the same time, it will lay out the methodological foundations of this study employed in the data collection. Data collected during the field research seeks to answer the research questions previously stated in this review. This chapter also addresses the rationale, ethics, and pilot of the study. It discusses relevant adjustments and decisions made as a result of the pilot.

CHAPTER THREE

Methodology

Overview

This chapter develops the methodology used in the data collection and analysis. In doing so, it provides a theoretical framework for the research study. ESL teachers at this school plan their lessons using the Teaching and Learning Cycle (TLC) framework to promote academic language development. The TLC framework emerged as a practical application of a genre-based approach to writing (Rothery, 1989, 1994, as cited in de Oliveira & Smith, 2019). This approach guides teachers into understanding how academic language operates at different levels or in other contexts. When applied to teaching, Halliday's Systemic Functional Linguistics (SFL) operationalizes language learning as an ongoing text/speech *deconstruction, joint construction, and independent construction* (de Oliveira & Smith, 2019). In this process, learners select various linguistic choices available to them moved by the genre, register, and (meta)functions requirements (Martin & Rose, 2007, as cited in de Oliveira & Smith, 2019). Therefore, the research tools developed in this chapter integrate the main tenets of TLC and Genre Theory together with the translanguaging framework. Both TLC and Genre Theory are the frameworks used by EL teachers at the district to plan their units. All data collection tools and assessments and the unit of work were crafted around the research questions: *Can translanguaging positively impact academic language development when teaching science content in multilingual classrooms? What are the challenges and successes teachers face when implementing translanguaging in these classrooms?*

This chapter delineates the methods used to collect data for this research, describes the setting, participants, and design used, and explains the rationale for the research procedure and the choices made in the unit of work. It also briefly discusses the Teaching and Learning Cycle (TLC) theoretical underpinnings and Systemic Functional Linguistics (SFL) since ESL teachers in this district plan within these frameworks. Finally, the next chapter outlines the goals of this research and the description of the ethics underlying the research process.

Study Overview

The primary purpose of this study is to explore ways in which academic language could be developed while working within frameworks that both deconstruct language and discourse, and recognize and incorporate the value of students' home cultures. Part of the research reviewed in the previous chapter revealed that teachers' understanding of academic language is quite limited. When planning for academic language development, teachers plan lessons centered around vocabulary (Seah & Silver, 2020; Zwiers, 2007). Another frequent misconception is that teachers will frequently understand it as separated from content (Ardasheva, Norton-Meier, & Hand, 2015; Zwiers, 2007). Teachers' decisions regarding what and how to teach are crucial for ELLs' success. However, they also appear to be critical in transforming learners' perception of success (Garcia, 2009; McKinney & Tyler, 2018; Zwiers, 2007). Research also indicates that learners view teachers' persistence and repetition as their genuine interest in learners' understanding (Townsend, Brock, & Morrison, 2018). However, most of the studies showed teachers center their teaching of academic language around lexis, especially ELLs. There is,

therefore, the risk of promoting a view that separates vocabulary from its context and, in doing so, furthers the separation between language and content (Seah & Sylver, 2020; Zwiers, 2007).

Translanguaging as an approach to language and a framework for teaching appears as a space for creativity and reflection regarding languages (García, 2009; García & Sylvan, 2011; Velasco & García, 2014). It also appears as a space for cultural and linguistic negotiations around scientific meanings where learners come together through their language practices (Karlsson, Larsson, & Jakobsson, 2018). Translanguaging promotes a view of teachers and learners as active researchers who engage in inquiry processes (García, 2009; García, Johnson, & Seltzer, 2017). As a framework, translanguaging mirrors the most customary practices entailed in science classrooms. For this reason, it could be an excellent fit to approach the teaching of scientific content in high-school multilingual classrooms.

This study explores the impact translanguaging could have in the areas I have previously mentioned while addressing the concerns from teachers and students that emerge from the literature. Research suggests that while learners may feel comfortable with translanguage in informal settings, they are skeptical about following this approach in academic settings. The stigma around language fluidity and the fear of teacher disapproval seems to be the reason for the skepticism (Karlsson, Larsson, & Jakobsson, 2018). On the other hand, teachers are sometimes reluctant to engage in these language practices because they find it challenging to recognize and validate all languages. Research also suggests that another reason for their reluctance to incorporate may have to

do with monolingual/monoglossic views knowingly or unknowingly upheld by the teacher (García, 2009; García & Vogel, 2017; García, Johnson, & Seltzer, 2017).

Thus, the present research methodology addresses the gaps and misconceptions that stem from the insufficiency of research on the use of specific translanguaging strategies with multilingual students. I am particularly interested in looking at the effects of translanguaging in academic language development and whether these promote or hinder growth. In the following section, I identify specific elements of both translanguaging and the TLC framework that could facilitate a culturally and linguistically responsive experience that is attainable in a multilingual classroom.

Theoretical Framework

The present classroom research is an experimental study involving both qualitative and quantitative methods. This research seeks to identify and explore the effects of translanguaging at content, instruction, and production/expression levels. At the same time, it aims to shed light on the challenges teachers may face when implementing elements of this framework and assess its effectiveness. To do so, I developed and crafted a curricular unit that integrates *explorar*, *evaluar*, and *presentar* stages from the translanguaging framework and the text *deconstruction*, *joint construction*, and *independent construction* from the TLC framework. Moreover, I developed content, language, and translanguaging objectives that realize the expectations listed in the Minnesota K-12 Academic Standards in Science (Commissioner Approved Draft, 2019) and the WIDA English Language Development (ELD) standards (Board of Regents of the University of Wisconsin System, 2020). While the objectives, content, and

assessments constitute the dependent variables in this study, learners' previous knowledge of climate, pollution, and the CER model are the independent variables. Participants' general mood throughout the task and their overall commitment to it are also independent variables considered in the study.

ESL teachers in this district school teach both in push-in and pull-out models. Each of them teaches either a leveled EL class or an academic reading/writing class and co-teaches a content class (science, physics, chemistry, social studies, etc.) together with a mainstream teacher. Pull-out models may involve bringing students with diverse backgrounds and experiences together. These models include level and academic writing and reading classes, where students from different grades and ages are grouped according to their English language proficiency level.

Recent versions of the TLC framework include another phase, *collaborative construction* (Brisk, 2015; de Oliveira & Smith, 2017), which proves its versatility and adaptability to changes and adjustments teachers address learners' needs more comprehensively. In line with this practice, the curricular unit designed for this study integrates translanguaging at the levels of content (*explorar*), explicit language instruction (*evaluar*), and expression of co-constructed knowledge (*presentar*) (García, Johnson, & Seltzer, 2017) in a cycle of text deconstruction and reconstruction. In this cycle, both teachers and students have room to enact learner *and* teacher roles. This curricular unit also draws the reading-to-learn process as it incorporates the notion of building background knowledge (Martin & Rose, 2005, as cited in de Oliveira & Smith, 2019). All the elements in this curricular unit were selected based on their potential to create a

culturally responsive, inquiry-based process to develop academic language when learning scientific content. Last but not least, the choices made in this curricular unit are in alignment with the Minnesota Standards for Science (2019) and the English Language Development Standards (Board of Regents of the University of Wisconsin System, 2020).

Design

The present research design is an experimental mixed methods study that seeks to assess the effect of translanguaging on academic language development. The rationale for the choice is that a mixed methods research and analysis allow for a deeper exploration of research questions whose answers require real-life contextual understandings, different perspective levels, and cultural influences (Mackey & Gass, 2016). Moreover, answers to the research questions require quantitative data to assess the extent to which translanguaging impacts the development of academic language and qualitative data to explore the challenges and opportunities for success when used to teach scientific content. The intentional combination and integration of these methods are geared toward profiting from their strengths as they provide a broader scope of information.

In this mixed-methods classroom research, quantitative data is collected in pre and post-test assessments. The data is collected using the Pre/Post-Test Rubrics (see Appendix B) which quantifies the instances of proficient academic language use and the cases of translanguaging, if any, in completing the Pre/Post-Tests (see Appendix D). The pre/post-tests are based on the Academic Vocabulary Spelling Inventory (AVSI) and Content-Area Academic Language Task (CAALT) measures (Townsend, Brock, & Morrison, 2018). However, the Pre/Post-Tests in this study explore a broader

understanding of academic language development. The Pre/Post-Tests also actively promote the use of translanguaging strategies.

Data from observations conducted throughout the unit are quantified using an Observation Rubric (see Appendix C) designed based on WIDA and English Language Arts National Standards as well as the fundamental tenets in the translanguaging framework. The primary purpose of this rubric is to record the instances in which students use translanguaging in their productions. Observations also provide qualitative data in the form of written or video records. These records may include but are not limited to video recordings of specific stages (e.g., explorar/building background knowledge), notes taken during the observation, or delayed observation descriptions. Observation records include reflections and possible interpretations of participants' performances throughout the unit.

Research Tools

The following research tools were designed to assess participants academic language use and development while approaching the learning process in a culturally responsive manner. The reasearch tools include the Pre/Post Test Rubrics that are used to assess the Pre and Post tests. On the other hand, an Observation Rubric is used to assess the use of translanguaging strategies throughout the unit.

Pre/Post-Test Rubrics. The Pre/Post-Tests (see Appendix B) are used to measure the effects of the treatment of dependent variables, in this case, the use of translanguaging and academic language development (summative assessment). These variables are reflected in the instructions, encouraging participants to incorporate their home language

in the writing task and the task itself (word box and claim, evidence, and reasoning requirement). Pre and Post Test Rubrics will be implemented at the beginning and at the end of the study.

Observation Rubric. The Observation Rubric (see Appendix C) will be used to quantify the data collected in the following assessments: KWL Chart, Teacher Conversation, Research Chart, and Writing Process. The rubric lists the assessments to be observed and what to observe in each of them. Success is understood as using translanguaging in two or more ways (Vocabulary, Content, Oral Expression, Written Expression). Challenge is understood as little to no use of translanguaging (one or no areas).

The unit consists of eight lessons that are divided into different stages. The stages that will be observed are: Building Background/Explorar, Joint-Construction/Evaluar, Independent Construction/Presenter. During the first stage students complete the “Know” and “Want to Know” sections of a KWL Chart first with information and questions about pollution and climate change in general, and then, they are encouraged to think about these environmental problems in their home countries. Students later use the Teacher Conversation model to teach their peers about the issues surrounding pollution and climate change in their home countries. During the Joint-Construction/Evaluar stage students complete a Research Chart with information about the environmental problems they found in the countries of their choice and again, they are encouraged to use their full repertoire. Lastly, data from the Writing Process (Planning and Drafting) will be collected in the same manner.

The use of students' home languages is encouraged and promoted in all stages. The Observation Rubric also includes the "Incidental" section for emerging reflections about students' use of translanguaging in the different stages (qualitative data).

Participants

Participants in this study are high school EL students at a high level (WIDA 5.0) Academic Writing class (see Table 2). Students in this class range in age (9th, 10th, and 11th graders), level of expertise, and background knowledge of the content to be studied. This class is highly diverse with most students coming from different backgrounds and experiences in their education processes as well as in their development of their multiple languages (English, and the languages spoken in their families —Somali, Burmese, Nepali, Hmong, Spanish, Amharic, Karenni. They are generally a very quiet group and have difficulty participating actively and spontaneously but they respond very well to the different activities and to the direct explanations about language (language focus). At the same time, they have demonstrated very strong writing skills in terms of spontaneous or free writing. The study involves 12 participants from this class and I was the researcher and instructor of the course.

Setting

The district, located in a Minnesota suburb, has over 1,000 students who speak a language other than English at home, from 47 different countries. About 26% of these households speak 56 languages, out of which Spanish, Hmong, and Karen are the most prevalent (Midwestern suburban school). All these students were impacted the most by the Covid-19 pandemic regarding their health, status, or academic performance, which

has exposed systemic inequities (Lazarín, 2020). In this disheartening scenario, however, the relationship between EL students and their teachers has proved effective in developing a sense of empowerment to navigate learning difficulties during a world pandemic.

The school has a detailed procedure for the identification of linguistically and culturally diverse students. This procedure is also used to monitor progress and to determine whether students can exit the EL services. After administering the Home Language Questionnaire, WIDA W-APT (developmentally appropriate measure) screener is used to identify eligible EL services students. This test measures social and academic content language. It allows ESL teachers to determine the student's stage of the language acquisition process concerning the WIDA stages (Entering, Beginning, Developing, Expanding, Bridging, Reaching).

Developmentally appropriate measures are used in the processes of exit and reclassification. Although the ACCESS test is required for a student to exit the EL program, the final decision is made based on input from different perspectives, data, and dialogue. Students must reach a 5.0 composite score on the ACCESS test as well as an overall proficient performance in their classes to exit the program. The ACCESS 2.0 is administered by the district each spring to EL students, and it provides information about the progress in the areas of reading, writing, speaking, and listening. Interestingly, teachers at this school consider other formative assessments (observations from teachers and specialists) to decide students and their future. While students in this class are

identified as level 5, they have not been recommended for exiting yet primarily due to their scores in written and spoken communication both in class and in standardized tests.

Materials

The assessment tools in this study include the Pre/Post-Tests (see Appendix D), the KWL Chart, the Teacher Conversation model, the Research Chart, and the Writing Process (explicit academic writing instruction; planning and drafting). The treatments are applied at the levels of content, instruction, and expression.

The KWL Chart (see Appendix E) is used as a multilingual device since participants are encouraged to write what they know in the language they see best to talk about their previous knowledge on the topic. At the same time, the Teacher Conversation model (see Appendix F) provides opportunities for teacher-led but, most importantly, student-led teaching opportunities. Learners share their findings following a What, When, Where, and Why model and, once again, are encouraged to do so using different sources in English or their home languages. This model prompts students to for instance name the issue in their home languages and to explain what it is. In line with the latter, the Research Chart (see Appendix G) encourages students to research information using both English and their home languages. Lastly, the Writing Process (see Appendix H) involves deploying participants' entire linguistic and non-linguistic repertoire in the planning, drafting, and editing of a paragraph making claim supported by evidence and reasoning.

Procedure

The study lasts four weeks and has the pre and post-test at the beginning and the end of the study. During the sessions, I conduct the research and teach the lessons in the curricular unit. During the first session with the participants in this study they complete the pre-test, incorporating the unit Uncoached Prompt. Students complete the same assessment at the end of the study (the Post-Test). Out of the eight sessions, two are devoted to conducting the pre and post-tests, and the remaining six are dedicated to the treatments, i.e., manipulation of independent variables. The steps in the present classroom research are detailed and described in Table 1.

Table 1

Procedure

| Lesson Focus | |
|---------------------|----------------------------------------------------------------------------------------------|
| 1 | Pre-assessment Pre-test |
| 2 | Build the field - Explorar KWL Chart Vocabulary - Working with visuals and glossaries. |
| 3 | Build the field - Explorar Teacher Conversation #1 - Research Chart |
| 4 | Introduce Text Form Claim, Evidence, and Reasoning |
| 5 | Text Deconstruction - Evaluar |

Language Feature(s)

- Identifying Claim, Evidence, and Reasoning in a text
- Making claims using modals to express possibility.

6 Joint Construction - Evaluar

Watch videos on the fires in Corrientes, Argentina

Complete the Teacher Conversation Research Chart as a whole class

7 Independent Construction - Presentar

Teacher Conversation #2 - Research Chart

Writing Process - Planning and drafting a paragraph making a claim, providing evidence and reasoning to explain an environmental issue.

8 Independent Construction - Presentar

Speaking - Students share their explanations to their peers

9 Post-Assessment

Post-Test

Ethics

This research is oriented toward identifying best practices for teaching that also recognize students' skill sets and multilingual repertoires. The cultural and linguistically responsive nature of this research adds value to both the school and the community. This study follows the Institutional Review Board (IRB) Exempt protocol that anticipates minimal risks to students as participants in it. The curricular unit aligns with the standards and expectations for the class. Thus, there will be no loss of instructional time or the need for students to stay at school after hours.

Participants' identities will remain entirely confidential, and no information related to their identities directly will be required in the study. Participants will be asked to complete activities and assessments anonymously. Pseudonyms are used in the study to protect participants' identities. Finally, the study also aligns with the school research and release of student information policies.

Summary

In this chapter, the theoretical framework and research methodology were described in full detail. At the same time, these descriptions showed how each assessment tool is designed to address the different elements in the research questions. Assessments were created in light of the practices that emerged in the literature review. The measurement tools, such as the rubrics, were designed based on standards. On the other hand, the research ethics and protocols align with the school research and release of student information policies.

The next chapter presents and analyzes the findings that emerged from the classroom research. The impact of translanguaging as language practice is, therefore, measured and discussed thoroughly in connection with academic language development. On the other hand, the following chapter identifies those practices that could lead to success or significant challenges and offers possible interpretations of why this happened. Lastly, quantitative and qualitative evidence is retrieved and closely examined to explore the nuances and generalities of the findings.

CHAPTER FOUR

Results

Overview

This study aims at exploring the impacts of translanguaging at different level (content, instruction, and production) when working on science content with multilingual learners. Furthermore, it seeks to identify the challenges and successes in the implementation of translanguaging in a highly culturally and linguistically diverse classroom. The following chapter discusses the study results and the outcomes of the unit on climate change that I implemented in an Academic Writing class at a district school in a Minnesota suburb. I conducted it between 2/23/2022 and 3/8/2022, and it lasted for eight lessons and two sessions devoted to the Pre and Post tests. It began with background building, continued with instruction on the text format (CER) and on targeted language (modal verbs to express possibility), and finalized with opportunities for collaborative (Teacher Conversation #1 and #2) and independent construction of a text (Post-Test). In this unit, participants explored translanguaging as a learning framework both autonomously and as a part of the class. Although the motivation and engagement levels varied throughout the unit of work, there was generalized growth in different areas, which could be related to translanguaging as it was the underlying cultural component in a unit of work based on science and scientific content.

Thus, this chapter aims to discuss the quantitative and qualitative data collection and explore the interrelation between the sets and how one reinforces the other and vice versa. For this reason, the Findings and Discussions section of this chapter is divided into

two main parts: Pre and Post Tests and Emerging Themes from Observations. Pre and Post tests show the areas of growth and decline at discourse, sentence, and word levels. On the other hand, observations reveal the attitudes and behaviors towards the presence of multiple languages in this classroom. The themes identified in the analysis of assessments and observations using the Observation Rubric (see Appendix C) show two distinct sides of and reactions to the same framework.

The study prompted several reflections in terms of participants' perception of home language use, importance, and value. The following themes surface as the underlying reasons: Bi/Multilingual Exposure, Sense of Agency, and Participants' Experiences Learning English. Several themes emerge when translanguaging is implemented either by the teacher/researcher or the students/participants. The observation of the lessons and the participants' assessments reveals that translanguaging appears as a Multicultural and Multilingual Bid for Lesson Engagement, a Space for Community Building and Identity Reconciliation, and a Catalyst for Academic Language Extension.

Participant Review and Development of the Study

The participants selected for this study (students in the Academic Writing B class I teach) took the Academic Writing A class between September and December. Previous units seen by these participants include The News, The Value of Learning a New Language, and Innovation and Technology. From the point of view of discourse (cohesive devices, nominalization strategies, etc.), they have learned different text genres, such as the Op-Ed, white paper, and summary and response essay. Furthermore, student participants are used to engaging in the text background building and the deconstruction,

collaborative construction, and independent construction of a new text of the same genre. As far as grammar, in previous units, participants have reviewed tenses and different types of conjunctions and their meaning and learned about parallel structure and run-on sentences.

The unit of study developed for this study followed a similar fashion to previous ones, with the systematic implementation of translanguaging at the level of content, instruction, and production as the only difference in the unit procedure. Thus, the study began with the Pre-Test (see Appendix D) and the entire lesson was devoted to it. The picture of a polluted industrial area full of fumes and trash was displayed on the smart TV so that participants could see it in color. They were also encouraged to come close to the picture if they wanted to identify more details. The following two sessions were devoted to building background on the topic. Student participants completed the two first columns in the KWL chart (see Appendix E). So, they wrote down notes about what they knew concerning the unit's topics and listed some of the areas for inquiry.

After that, participants joined a group based on their home languages (see Table 1): Spanish (2), Somali (4), Nepali (2), Amharic, Burmese, Karenni/Kayah, and Hmong (4). Participants worked in those groups to complete a matching activity in which they were presented with the Pre-Test vocabulary and had to match each term to their corresponding pictures. During these exchanges, they were encouraged to use their home language. Some students, particularly those who did not have a language partner, needed more encouragement than others. Participants clarified the definitions of the vocabulary items as a whole class. Then, each group was assigned a term from the matching activity

for them to complete Teacher Conversation #1 (see Appendix F). Members in each group researched information and completed the research chart. They later had to partner with other participants to explain the term assigned.

The subsequent three sessions were devoted to the deconstruction of the Claim, Evidence, and Reasoning (CER) format, the work on grammar accuracy (use of modals to express possibility), and the modeling of Teacher Conversation #2 (see Appendix G). In the second Teacher Conversation, participants had to choose an environmental issue and explain it using the CER format. Before doing so themselves, they worked on a lesson on the fires in Corrientes, Argentina, and watched videos on the causes and effects of these fires. Lastly, participants also watched videos on Argentina's proposed legislation to address climate change and the loss of wetlands.

The teacher/researcher and participants later completed the Teacher Conversation Research Chart together. Participants worked in groups to complete the Teacher Conversation #2 - Research Chart during the following session. As a part of this assignment, participants also wrote a one to two-paragraph explanation to share with others from a different language group. In the last session, participants completed the Post-Test, and once again, they were encouraged to use their home language whenever they felt they needed to.

The following table (see Table 2) shows the main characteristics of the twelve participants in this study, such as the language spoken at home/by most family members, proficiency in English and the Home Language, and the language accommodations required by each of the families. Lastly, the EL classes taken by students in the second

trimester (when the study was conducted) were also recorded. Pseudonyms are used throughout the study to protect participants' identities and private information.

Table 2

Participant Review and Demographics

| Participant | Grade | Home Language | English Proficiency Level | General Observations |
|---------------------------|--------------|----------------------|----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Nara (she/her) | 11th | Spanish | WIDA Level 5 | Bilingual and bi-literate Uses home language socially and academically Family needs an interpreter EL classes: Academic Writing |
| Carlos (he/him) | 11th | Spanish | WIDA Level 5 | Bilingual and bi-literate Uses home language socially Family needs an interpreter EL classes: Academic Writing |
| Mandevilla (they/them) | 10th | Somali | WIDA Level 5 | Multilingual and multi-literate (English, Somali, and Arabic) Uses multiple languages socially and academically Family does not need an interpreter EL classes: Academic Writing |
| Sada (she/her) | 10th | Somali | WIDA Level 5 | Bilingual, can write how words as they sound Uses home language socially and academically Family needs an interpreter EL classes: Academic Writing |
| Sagal (she/her) | 10th | Somali | WIDA Level 5 | Bilingual, can write how words as they sound Uses home language socially Family does not need an interpreter EL classes: Academic Writing |

| | | | | |
|----------------------|------|-------------------|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| Yaabe (he/him) | 10th | Somali | WIDA Level 5 | Bilingual Only uses home language with grandmother Family does not need an interpreter EL classes: Academic Writing |
| Sanani (he/him) | 11th | Nepali | WIDA Level 5 | Bilingual Uses home language socially Family needs an interpreter EL classes: Academic Writing |
| Salmee (she/her) | 10th | Nepali | WIDA Level 5 | Bilingual Uses home language socially Family needs an interpreter EL classes: Academic Writing |
| Pyi Taw (she/her) | 9th | Karenni, Kayah | WIDA Level 5 | Bilingual Uses home language socially Family needs an interpreter EL classes: Academic Writing |
| Keej (he/him) | 11th | Hmong | WIDA Level 5 | Bilingual, learning how to read and write Uses home language socially Family does not need an interpreter EL classes: Academic Writing |
| Anbassa (he/him) | 11th | Amharic | WIDA Level 5 | Speaks little to no Amharic Does not use Amharic Family does not need an interpreter EL classes: Academic Writing |
| Aye (he/him) | 11th | Burmese | WIDA Level 5 | Bilingual Uses home language with parent Family needs an interpreter EL classes: Academic Writing |

The table shows that while most of them are bilingual, only a few are bi-literate; therefore, their knowledge of their home language may be limited to access to reading materials or complete written assignments. Another characteristic of this set of participants is that they were taking only one EL class (Academic Writing B) during the

study's development, which was the case during the first trimester as well. Participants are between the ages of 14 and 16, grades 9th to 11th and only a few of them take other classes together. The table above also shows that most families (8 out of 12) need an interpreter for parent-teacher conferences or meetings.

Findings and Discussions

The following section reviews both qualitative and quantitative findings and themes that emerged from assessments and observations. The mixed-methods approach used in the study produced a copious amount of data that reveals patterns in participants' attitudes, behaviors, and learning processes when translanguaging is the framework for inquiry. Pre and Post-Tests results are discussed first in order to determine participants' areas of growth and decline at discourse, sentence, and word levels. These findings are crossed and compared to the themes identified in analyzing Observation Rubrics (see Appendix C) and Journal (see Appendix H).

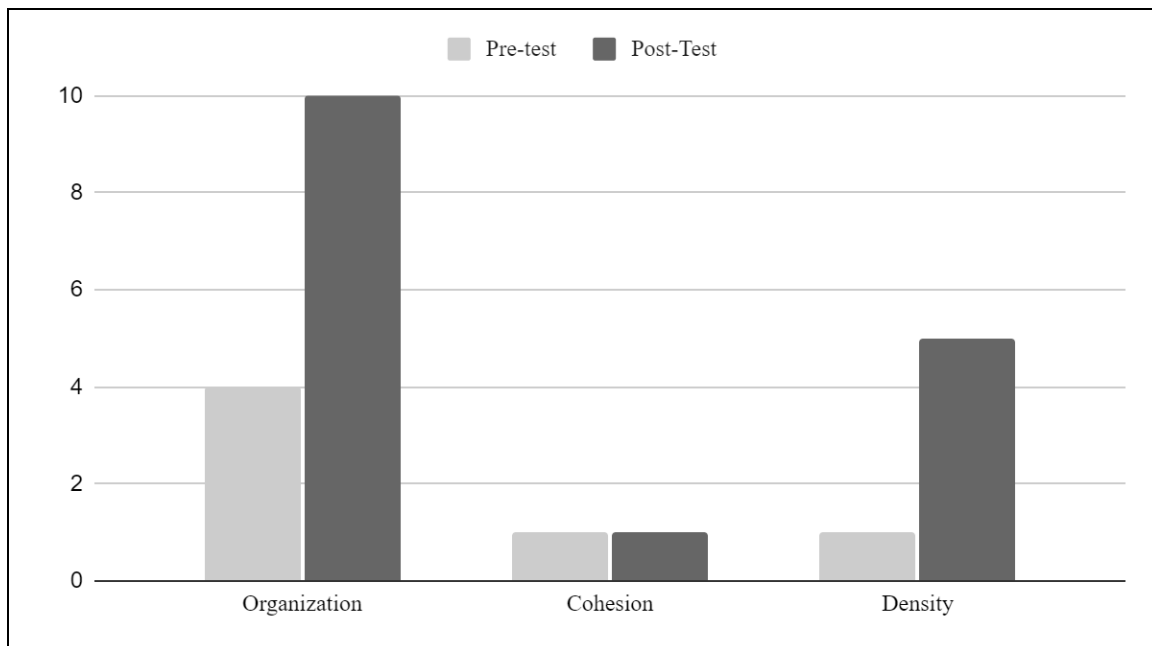
Pre and Post Test

The Pre and Post Tests were conducted at the beginning and at the end of the unit of this study in a similar fashion. Instructions were read out and clarified to participants. The use of the home language was encouraged by the teacher/researcher and participants had the entire time to complete the task. In both opportunities, participants wrote their paragraphs within the allotted time and both tests ran smoothly.

The Pre and Post Tests were designed to assess the development or lack thereof in the areas of discourse, grammar, and lexis. Both tests allow the researcher to look closely not only at language accuracy but also at its variety and complexity. Moreover, the rubric

used to collect the data from Pre and Post Tests is based on WIDA standards for the participants' level. For this reason, this tool is also effective to compare and contrast standards that have been attained with those that have not and to show how a culturally responsive approach to teaching and learning could impact this process.

Discourse Level. At the level of discourse, participants were asked to write explanatory paragraphs using the CER format and a series of Tier 3 words specifically related to the content of the unit. In this regard, the rubric was used to analyze the organization, cohesion, and density of language. In terms of organization, Pre and Post tests were examined to determine whether texts conveyed the intended purpose using genre-specific patterns. Cohesion, on the other hand, was examined from the point of view of the use of devices and their variety. Lastly, density was determined by the use of discipline-specific lexical items, nominalization strategies, and other ways to condense ideas. Table 3 illustrates the findings in the Pre and Post Tests:

Table 3*Discourse Level*

The table shows a significant growth in terms of language organization and density, while cohesion remained unchanged. Only 4 out of 12 participants achieved the standard set for language organization in the Pre-Test compared to the Post-Test (10 out of 12 participants). What stood out about this change was that most participants were able to write a claim in the Post-Test compared to the Pre-Test. Moreover, density was also an area of growth since 5 out of 12 participants were able to achieve the standard set for density compared to Pre-Test (only 1 participant). Interestingly, not only did cohesion not grow but also remained extremely low with only 1 participant showing variety in the use of cohesive devices.

Sentence Level. The analysis of the Pre and Post Tests at the sentence level also revealed several areas of growth, as well as, an improvement in participants' descriptions of the environmental issue(s) they could see in the picture. At the sentence level, then, the use of a variety of sentence structures with different levels of complexity was tallied for each participant in their claim, evidence, and reasoning. Table 4 shows both the starting point and the areas of growth, no growth, or decline for each category.

Table 4

Sentence Level

| Grammar Complexity | | Pre-Test | Post-Test |
|---------------------------|-------------------------------|-----------------|------------------|
| Claim | Simple sentences | 6 | 4 |
| | Compound sentences | 3 | 2 |
| | Complex sentences | 4 | 6 |
| | Complex compound sentences | 2 | 2 |
| | Conditional structures | 1 | 1 |
| | Cause and effect conjunctions | 1 | 1 |
| | Adversative conjunctions | 1 | 0 |
| | Comparative conjunctions | 0 | 0 |
| | Does not use conjunctions | 10 | 11 |
| | Uses other sentence structure | 2 | 1 |
| | No claim | 1 | 1 |
| Evidence | Simple sentences | 6 | 7 |
| | Compound sentences | 1 | 6 |
| | Complex sentences | 1 | 2 |

| | | | |
|-----------|--------------------------------|---|---|
| | Complex compound sentences | 1 | 4 |
| | No evidence | 6 | 0 |
| Reasoning | Simple sentences | 1 | 3 |
| | Compound sentences | 2 | 3 |
| | Complex sentences | 3 | 8 |
| | Complex compound sentences | 1 | 3 |
| | Conditional structures | 1 | 2 |
| | Cause and effect conjunctions | 1 | 4 |
| | Adversative conjunctions | 0 | 0 |
| | Comparative conjunctions | 0 | 0 |
| | Does not use conjunctions | 7 | 8 |
| | Uses other sentence structures | 2 | 1 |
| | No reasoning | 4 | 2 |

Table 4 not only tallies the different structures and types of sentences used by participants but also reveals consolidation in their understanding of the CER format. While the number of participants who were not able to make a claim initially remained the same (1 participant), the number of participants who did not provide evidence or reasoning for their thinking decreased - from 6 to 0 in the case of the evidence, and from 4 to 2 participants in the case of the reasoning. Moreover, out of the three, the reasoning was the area that exhibited more growth and variety in sentence structures overall with the highest number of participants using complex sentences.

On the other hand, it is important to note that the use of conjunctions remained extremely low throughout and participants did not actively incorporate discipline or genre-specific devices to connect ideas in sentences (internal cohesion). More participants used conjunctions in the Pre-Test than in the Post-Test to express their claims. However, the number of participants that used cause and effect conjunctions in their reasoning increased by 3 participants between the Pre and Post tests. In line with these findings, the use of alternative sentence structures remained low and even decreased in one of the areas (reasoning). Data collected from participants' tests show passive voice to be the most used sentence structure not listed in the Pre/Post-Test Rubric (see Appendix B).

Data Crossing: Use of Vocabulary and Adoption of Translanguaging Strategies

Throughout the unit, although participants were organized into groups according to language, two additional groups emerged—one actively incorporated translanguaging strategies (Spanish and Somali), and the other group chose not to (Nepali, Amharic, Burmese, Karenni/Kayah, Hmong, and Somali). Interestingly, while language grouping fostered collaboration in most groups, even in the Nepali-speaking group that did not actively incorporate translanguaging strategies onto their work, it did not operate in the same way for Yaabe (Somali) who mainly was disengaged and did not incorporate strategies as did his peers in the language group. For this reason, participants' performance at the word level is analyzed by crossing the data from qualitative assessments with the data from Pre and Post Tests.

Word Level. When analyzing the data on the use of vocabulary across the two groups that were previously mentioned, both growth and decline can be seen among them. The rubric used to analyze the use of the vocabulary selected for the unit focuses on accuracy and on whether or not participants incorporated the words from the word box (even if it was just one term). Furthermore, the rubric also probed for the use of Tier 2 and Tier 3 words either accurately or inaccurately. Table 5 below illustrates the findings and results of the data crossing:

Table 5

Word Level

| Translanguaging Use Throughout the Unit | Precision of Language | Pre-Test | | | Post-Test | | | Growth | | |
|-----------------------------------------------------------------------------------------|------------------------------------------|------------|---|---|-----------|---|---|--------|----|----|
| | | CER Format | C | E | R | C | E | R | C | E |
| Use of translanguaging (Spanish + Somali) | Uses words in the box accurately | 2 | 1 | 1 | 3 | 3 | 3 | 1 | 2 | 2 |
| | Uses the words in the box inaccurately | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Does not use the words in the word box | 3 | 4 | 4 | 2 | 1 | 2 | -1 | -3 | -2 |
| | Uses Tier 2 or Tier 3 terms accurately | 2 | 0 | 1 | 2 | 3 | 2 | 0 | 3 | 1 |
| | Uses Tier 2 or Tier 3 terms inaccurately | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| No use of translanguaging (Nepali + Somali + Burmese + Amharic + Hmong + Karenni/Kayah) | Uses words in the box accurately | 2 | 4 | 2 | 4 | 4 | 1 | 2 | 0 | -1 |
| | Uses the words in the box inaccurately | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 1 | 0 |

| | | | | | | | | | |
|------------------------------------------|---|---|---|---|---|---|----|----|----|
| Does not use the words in the word box | 5 | 3 | 3 | 3 | 2 | 5 | -2 | -1 | 2 |
| Uses Tier 2 or Tier 3 terms accurately | 1 | 1 | 4 | 1 | 1 | 3 | 0 | 0 | -1 |
| Uses Tier 2 or Tier 3 terms inaccurately | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

The data reveals that, while both groups exhibited some level growth, the group of participants who engaged in the use of translanguaging strategies grew in all three areas. When looking at the number of participants who did not use translanguaging strategies throughout the unit, we see that while the number of participants who used the target vocabulary in their claims increased, the number of participants using the vocabulary in the evidence did not change.

The use of target vocabulary in the reasoning decreased by one participant. On the other hand, the table also shows that the number of participants who did not use the vocabulary decreased in both groups between the Pre and Post Tests; the decrease was not as significant in the group who did not use translanguaging strategies. Participants in this group, too, used the terms inaccurately. Lastly, it is important to note that neither group used a great variety of other Tier 2 or Tier 3 words, and when they did, they did not use them inaccurately.

Other patterns emerge when examining participants' performance when developing a claim, providing evidence, and reasoning. Once again, there are several commonalities between those participants who used translanguaging strategies compared to those who did not. One of the most salient patterns was the different arrangements

participants in each group used for the organization of the paragraph—in particular, the part of the paragraph where they decided to place the claim. Table 6 shows the CER format organization patterns used by participants in Pre and Post Tests:

Table 6

CER Organization Formats

| Translanguaging Use Throughout the Unit | Claim, Evidence, and Reasoning Organization Formats | Pre-test | Post-test |
|-----------------------------------------------------------------------------------|------------------------------------------------------------|-----------------|------------------|
| Use of translanguaging (Somali + Spanish) | CER | 0 | 4 |
| | ECER | 0 | 1 |
| | CEC | 1 | 0 |
| | CR | 2 | 0 |
| | C | 2 | 0 |
| | Total participants | 5 | 5 |
| No use of translanguaging (Nepali + Somali + Amharic + Burmese + Hmong + Karenni) | CER | 2 | 3 |
| | ECR | 0 | 1 |
| | ECER | 2 | 1 |
| | ERC | 1 | 0 |
| | ECE | 0 | 1 |
| | ER | 1 | 0 |
| | EC | 1 | 1 |
| | Total participants | 7 | 7 |

There are several characteristics about how participants approached the organization of the CER format in the Pre and Post tests. Firstly, the most salient feature

is that only two participants followed the CER format in the Pre-Test. The different organizational patterns that emerged in the Pre-Test show that participants in the group who did not use translanguaging seemingly preferred to present the evidence before stating their claim. Only 3 out of 7 participants used the CER format in that order in the Post-Test. Conversely, 4 out of 5 participants who used translanguaging strategies followed the CER format order in their paragraphs. Moreover, while in the Pre-test, all participants skipped at least one of the parts (evidence or reasoning), they did not miss any part in their Post-test. Interestingly, while the other group increased the number of participants following the CER order by 1, most participants continued presenting the evidence first.

Assessment Observations: Emerging Themes

Observation rubrics and journal entries reflect an overall disregard for the use of participants' home languages for academic development or social interactions. Among the reasons for this, I identified participants' Bi/Multilingual Exposure, Sense of Agency, and Experiences Learning English as the underlying characteristics in this group that prevents them from engaging in the use of their home language. Then, the present section aims to describe the themes I identified in the analysis of participants' assessments and my observation journal.

Bi/Multilingual Exposure. The group of participants whose data were collected for this study varies significantly in the level of proficiency they have in their home language and English. Only 5 out of 12 participants can speak, read, and write in their home language. Therefore, most of them chose English as the language to communicate

and to complete the different assessments. Moreover, from the beginning of the study, active participation varied significantly from class to class, and the use of participants' home languages was little to none in 7 out of 12 participants. These aspects are reflected in my journal entry for day 3 (see Appendix H). In this regard, promoting the use of participants' home languages was very challenging because the access to resources was limited. Although several applications nowadays offer automatic translations for texts and video, they did not all offer the language varieties in this classroom (e.g., Karenni/Kayah).

Exposure and use of the home language are also limited in participants' inner circles. After working on Teacher Conversation #1 and #2, I talked to the different groups, and they all reflected a preference for the use of English over the home language in most cases. Sanani and Salmee stated that they only use their home language with family and friends whose home language is Nepali. Sanani stated that he would only use Nepali in a room full of people who only speak Nepali. Carlos and Nara, too, stated that they used Spanish with family and friends, although Carlos only speaks Spanish with his mother and father, but not with his siblings. Sagal, Sada, and Mandevilla said they use Somali frequently with family and friends but, like the others, never use it for academic purposes. Anbassa (Amharic) and Yaabe (Somali) only speak their home language with the elders in the family (grandparents), and Ambasa only speaks very little Amharic.

Sense of Agency. Throughout the study, I noticed the participants' agency in their language development journey was quite low. Student agency is understood as learners as leaders in their learning process and learning as a discovery process initiated by learners

themselves with the guidance of teachers (Martin, 2004). While there were certain dynamics that aimed at promoting participants' sense of agency in learning, several groups simply did not engage in them. When having the choice to work in groups or individually most participants chose to work in groups. However, those who worked in groups were also those students who had a language partner. Those who did not, although they were sitting in the same station they preferred to work individually sometimes while listening to music on their headphones. Overall, lessons were characterized by some periods of high engagement (Teacher Conversations #1 and #2, content instruction using sources in Spanish) and long periods of silence (Pre/Post Test, KWL chart, CER format, and modals of possibility lessons) (see journal entries Days 5-7 - Appendix H).

This inclination towards individual work and participation prompted by nomination prevents participants from developing initiative in and ownership of their work and learning process. Collaboration fosters negotiation and decision-making. These two are fundamental features not only in the development of participants' agency but also their identity in learning. Considering some of the families do not speak English, there seems to be a separation in participants' identity development. English seems to have become the norm at the expense of the development of the home language. The identity fragmentation, thus, manifests as silence, little to no participation, and a lack of interest or deep engagement. The latter seems to be tied to a lack of cultural interest. Anbassa (Amharic), Aye (Burmese), Pyi Taw (Karenni/Kayah), Keej (Hmong), Carlos (Spanish), and Nara (Spanish) researched information about countries other than those they or their families came from. Carlos and Nara researched information about Brazil where while

there is a cultural tie with Latin America, language is not precisely what Brazil culturally shares with other Latin American countries. On the other hand, Sanani and Salmee (Nepali) chose Kathmandu, and Sada, Sagal, Mandevilla, and Yaabe chose two different regions in Somalia.

Participants' Experiences Learning English. Participants' experiences learning English are also very different from each other. There are multiple cultural backgrounds and also diverse experiences among participants as members of the school community. The fact that participation was prompted mostly by myself as the teacher/researcher made me wonder (1) whether participants show initiative or a more in-depth understanding in other classes, and (2) if they are prompted with questions or asked to give their opinions or explanations in other classes as well. Participants seem to be engaged in a quiet development of English, in some cases, at the expense of the development of their home languages.

Per my observation reflections and rubrics, I would also argue that participants' preference for English is tied to both their experiences as English Learners in this and other schools and to the perception that their current knowledge of English is enough to succeed in their classes. However, some practices they engage in actually show the contrary. One of those practices is copying information verbatim from sources with or without citations. While the selection of the sources and the information is somewhat accurate, this practice leads to the lack of development of participants' voices, and, in some cases, it also entails plagiarism.

Interestingly, the choice of English and these practices to complete tasks also seems to be tied to the value and relevance English has for participants' families. In the cases of Carlos and Nara, for example, Carlos' preference for English appears to be supported by his family. Carlos was born in the U.S. and although his parents were not, and they both speak Spanish, Carlos and his siblings communicate in English most of the time. Nara's case is different, yet with similar outcomes. Nara was born in Nicaragua and speaks Spanish most of the time, however, when working on school assignments she says she does not see value in working with sources in her home language. The issue arises when in order to perform in English while using sources in English she chooses to write direct quotes from sources so, it becomes more challenging to see her voice in her production.

What is even more interesting, however, is that both qualitative and quantitative information suggest that translanguaging could address the challenges posed by the heterogeneity of a class. The analysis of both the observation rubrics and the observation journal show that translanguaging appears as a (a) multicultural and multilingual bid for lesson engagement, (b) space for community building and identity reconciliation, and (c) catalyst for academic language extension. These themes are going to be analyzed, then, in the sections that follow.

Multicultural and Multilingual Bid for Lesson Engagement. There were specific instances throughout the unit in which translanguaging at the level of content facilitated multicultural and multilingual engagement. Although the process of working with sources in languages other than English in the classroom could be very demanding,

it is worth experimenting with this implementation in the classroom to foster engagement and add a layer of achievable challenge. Introducing sources in other languages and analyzing them in class prompted a shift of focus/power from the teacher/researcher to participants as they necessarily became experts when discussing the sources in their home languages. At the same time, there were also instances where participants became intrigued by the discussion around language even when it was not necessarily a language they spoke.

On day 7 of the study (see Appendix H), participants collaborated with me to complete the research chart on the fires in Corrientes, Argentina. I asked Carlos and Nara if they wanted to translate some parts of the videos for their classmates and at first, they agreed but eventually, they did not feel comfortable or confident enough to do so. While watching the videos, though, I noticed that in the work on translations, participants who spoke languages other than Spanish would accurately answer the meaning or translations in English of certain words (cognates). This is reflected in my journal entry from Day 7:

Figure 1

Research Journal entry Day 7

Day 7:

“We discussed the causes and effects of the fires in Corrientes, Argentina. The fires are caused primarily by the droughts and the droughts are caused by the lack of precipitation. The root cause is that wetlands are disappearing as a result of climate change; there is not enough water so there is not enough rain.

Sada and Sagal (Somali) and Salmee and Sanani (Nepali) answer the meanings of the words in Spanish. We discuss the etymology of these words.

- *Humedales = wetlands → they say humidity*
- *Precipitaciones = precipitation*
- *The video had numbers and percentages paired with visuals which made it easier for students to construe meaning”*

These discussions and collaborative work around language equipped participants to later apply translanguaging strategies themselves. This was the case of Sada and Mandevilla who decided to use resources in the Somali language and research information about two regions in Somalia for Teacher Conversation #2. Mandevilla also used Somali when completing their research chart. As a result, they not only showed a greater understanding of content overall in their Post Test but also exhibited more engagement and motivation when explaining the environmental issue they researched to their peers. Figure 2 shows Mandevilla's Teacher Conversation #2 - Research Chart. Figure 3 shows Mandevilla's Post Test.

Figure 2

Mandevilla's Teacher Conversation #2 - Research Chart

Unit 4 - Teacher Conversations

1. Work in your language group.
2. In this activity you will be the teacher.
3. Choose 1 (one) environmental issue that is related to the topic of the unit. This should be taking place in a different part of the world other than the U.S.
4. Look for information about the issue using the language of the group.
5. Fill in the chart with all the information you need to explain the issue. You may use translation and resources in your home language. You may also use your home language for planning, drafting, and writing.
6. Write an explanation to the issue using the CER format.
7. Find and partner from a different group and use your chart to explain the term.

| | Description |
|-------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| What | Droughts - lack of food - livestock dying - Unable to grow crops - Major food and water shortages |
| Where | Somalia |
| When | Maalca biyo ta'aan iyo Roob ta'aan ku dhaco deegaan - Waxaa yarada wax soo saarka beeraha iyo dhirta tasi u dhacda, xoolaha iyo kayawnaanka. |
| Why | -Roob ta'aan - Somalia's climate is a semi desert - Climate change with severe weather conditions, Because somalia is located near The equator |

Figure 3

Mandevilla's Post Test

The excessive amount of pollution is causing the earth a lot of harm. In the picture, the land is barely recognizable because of the amount of garbage that is ^{filled} piled onto it. The sky is cloudy because of the smoke that is being released. The pollution of the air and ground later causes larger issues like global warming or loss of wildlife. An example of loss of wildlife is the turtles. People are always being urged to use less plastic so that it won't get dumped into the natural habitats of animals who ^{later on} cannot eat them eat them ^{later} and die. The effect on pollution has on the planet is global warming, which is the leading cause ^{of} for climate change. Climate change is another challenge people are trying to resolve, the effects it has on the environment ^{are} is severe. It is the leading cause for droughts, wildfires, floods and many other ^{crises} crises. The solution for climate change is still being worked into but it cannot be solved if our pollution continues at this rate. While climate change is a huge problem, its not all there is. ~~The use of~~ The use of pesticides and ^{the accumulation} sediment pollution are also issues. A lot of them contribute to the harming of this planet.

We can see in Mandevilla's production how the underlying multicultural nature of the unit seems to translate into in-depth engagement and motivation. This also seems to impact Mandevilla's voice presence and the organization of their text. Long-term implementation of translanguaging strategies in the classroom could, therefore, be a springboard for students' multicultural and multilingual engagement that would, in turn, impact their comprehension and application of content.

Space for Community Building and Identity Reconciliation. One of the findings that I believe should be highlighted is how translanguaging proves to be effective for community building for its very essence. At the same time, the crafting of a unit of work that incorporated translanguaging strategies at different levels served as space and opportunity for identity building, trauma healing, agency development, and academic language extension rooted in the understanding of participants' home languages as an asset instead of as a deficit. These, in turn, and in the long term could lead to participants' reconciling their multilingual identities.

One of the first dynamics proposed in the unit of work involved language grouping so, participants joined their language group several times throughout the unit. It was interesting to see how this grouping already existed among Sada, Sagal, and Mandevilla (Somali) who generally worked together before the study. During the study, they were joined by Yaabe. However, in cases in which participants had never worked together before, the shared cultural and/or linguistic background seems to have played a role in their communication toward task achievement. Carlos and Nara, for instance, used Spanish when planning both of the Teacher Conversations and in general seemed

comfortable working together. Sanani and Salmee who are in the 11th and 10th grades respectively, also seemed engaged and motivated in working together and researching information about Kathmandu where both of their families come from. Even when they did not use Nepali in their work, Nepali culture was present in the selection of content and the discussion of it. Shared home languages seem to have brought and kept language groups together.

Community-building via the introduction of sources in multiple languages lends itself effectively to the reconciliation of participants' identities. The strategic implementation of translanguaging at the levels of instruction and production brings the value of a multilingual background to the surface. This is important because, as was discussed previously, some families decided to prioritize English language development over home language development for the education of their children. Therefore, these learners show a seemingly disjointed identity in terms of language — English and the language of the family. Figures 4 and 5 below show Keej's (Hmong) and Carlos's understanding and recognition of the value of using the home language in his KWL chart:

Figure 4

Keej's KWL Chart

Unit 4: Pollution and Climate Change

1. Think about yesterday's Pre-Test.
2. What do you currently know about the topic(s) of the unit?
3. What do you currently know about the Claim, Evidence, Reasoning (CER) format?
4. Based on the challenges posed by the Pre-Test, what do you want to know more about? What do you want to learn?
5. Fill in the following KWL chart with as many details/information as you can using the guiding questions.
6. You can use your home language if there are ideas or terms that you can better express in it.

| K (know) | W (want to know) | L (learned) |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> • The topics tell me what they are going to talk about • Topics is ^{are} Pollution and Climate Change • There was a picture that showed us about our topic Pollution and Climate Change • Pollution is talking how the living is going well or bad • Climate Change is what we change like gas station when you put gas in your when it wasn't expensive but they increase • Claim is that you know it | <ul style="list-style-type: none"> - want to know all pollution and climate change - why was a lot of trash or garbage on all the grass land? - why didn't they want to clean it up? - why are <u>ten</u> of dirt all over with the trash or garbage stuff? - why ^{do} many <u>factory</u> <u>ies</u> having gases <u>uses</u> a lot when it <u>is</u> so smoky in the air? | <p>What I learned that in some country their pollution and climate change was <u>bad</u>.</p> <p>Mrs. Borre researched her project of what was happening in her country when she used to live. We saw that the forest was on fire and horses were running away from the fire.</p> <p><u>We did CER with our group that speak the same language as you while researching and we could speak our language with each other.</u></p> |
| <ul style="list-style-type: none"> • Evidence is supporting your claim <u>provide</u> • Reasoning is to <u>giving</u> in your thinking of this | | <p><i>language</i></p> |

Figure 5

Carlos' KWL Chart

Unit 4: Pollution and Climate Change

1. Think about yesterday's Pre-Test.
2. What do you currently know about the topic(s) of the unit?
3. What do you currently know about the Claim, Evidence, Reasoning (CER) format?
4. Based on the challenges posed by the Pre-Test, what do you want to know more about? What do you want to learn?
5. Fill in the following KWL chart with as many details/information as you can using the guiding questions.
6. You can use your home language if there are ideas or terms that you can better express in it.

| K (know) | W (want to know) | L (learned) |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> • It was caused by alot of People • It took time to get to there • garbage and burning fuel • effects environment • May affect weather • damages water and ocean • Polluted air we breathe • everyone is involved with the outcome • Is bad for animals | <ul style="list-style-type: none"> • how long it takes to get bad? • What is the worst that happens? • how do you fix it? • Does it really involve everyone? | <ul style="list-style-type: none"> • Learned about CER • Learned more about vocabulary connected to pollution and different types of pollution • Learned different words using words I already knew in spanish. • Learned to get evidence from different language • learned about pollutants • Did research on pollutants using sources in english and spanish. Learned that they are both natural and human made • researched a topic of pollution around the world to better understand what is going on. |

Keej and Carlos detailed how this unit of work was about incorporating home languages as an asset as much as it was about the content and language they learned. For example, Keej wrote: “We did CER with our group that speak[s] the same [language] as you while researching and we could speak our language with each other” (Figure 3 Keej’s KWL Chart).

Similarly, as shown in Figure 4, Carlos expressed how in this unit he learned that he could use his home language to support his learning of content in English:

“Learned different words using words I already knew in Spanish. Learned to get evidence [in] different language[s]” (Figure 4 Carlos’ KWL Chart).

In this regard, then, it is important to note how the very nature of the unit was effective for participants to see their language background is welcomed and valued in the comprehension and development of content. In many ways, this unit seems to serve multiple purposes, one of which is multicultural and multilingual representation. This unit shows participants they can bring their multicultural/lingual background knowledge to the table as this is valued by all members in the classroom community, including the teacher, as an asset for learning.

A Catalyst for Academic Language Extension. The last major finding I would like to discuss is how translanguaging generated the appropriate environment for language extension. When comparing the work between participants who did and did not engage in the use of translanguaging practices throughout the unit, we can see how those who did were able to benefit immediately from this implementation. Furthermore, translanguaging strategies were successfully implemented by one of the participants who instead of relying on direct quotes from sources, used translanguaging strategies to convey the intended meaning more accurately.

When looking closely at Carlos’ and Pyi Taw’s Post tests, I realized that while Pyi Taw’s chose vague lexis, Carlos attained accuracy in terminology through the use of cognates which directly relates to the strategies implemented in the unit of work. For example, Pyi Taw used the words “people” and “bad” and only used two words from the word box in her explanation of the environmental issue. Moreover, she used the sentence

frame “if we don’t change...” in three different cases throughout her explanation. Carlos, on the other hand, used four words from the word box and terms like “human activity”, “natural causes”, or “human-made” to explain the environmental issue(s) he could see in the picture. Figures 6 and 7 illustrate Pyi Taw’s and Carlos’ Post-tests.

Figure 6

Pyi Taw's Post-Test

Writing task: Claim, Evidence, Reasoning

- 1 (one) paragraph (7-10 lines)
- Use of home language
- Use of words in the word box

① If we don't change our ^{behaviors towards} ways with how we're living, our atmosphere is going to be covered with trash and polluted lakes and oceans. so many factories and engines used harmful chemicals and dump ^{them} it into oceans. All the bad air caused by factories and cars could lead to air pollution. Air Pollution leads to heart and lung disease ② If we don't change the way ^{we're living} children at a young age will have to deal with a long term bad health, our life span is going to decrease ③ if we don't change our way of living and stop climate change. we should spread the word of what climate change is doing to our world and maybe make people are going to take action. ✓

E

R

Figure 7

Carlos' Post-Test

Writing task: Claim, Evidence, Reasoning

- 1 (one) paragraph (7-10 lines)
- Use of home language
- Use of words in the word box

When
ged in
The ^{part} picture above was caused by human activity!

I know that pollutants are both natural and human-made. Human-made pollutants were accumulated by ...

Chemicals we use and cause sediment pollution thermal pollution and causes changes to the atmosphere. The picture shows garbage on an empty field with dead grass. I can see smoke coming from the city afar. This leads me to believe that it was caused by human activity because I see forms of thermal pollution.

* the relationship between the two phenomena is not clear.

The last case I believe it is important to discuss is that of Nara so as to compare her work throughout the unit when she could look for resources and use that in her explanation versus the Post-Test in which she did not have access to any resources but those present on the instructions sheet. It should be noted that while her selection of information when writing about Brazil is quite accurate, her description cannot really be used to assess her level. On the contrary, her Post-Test better illustrates what she can currently express and explain in English and what she could potentially express with due guidance considering she already possesses that knowledge in her home language. Figure 8 shows Nara's Teacher Conversation #2 - Research Chart and the paragraph she wrote based on the evidence and sources she found. Figure 9 shows Nara's Post-Test in which she uses translanguaging to express a more complex idea.

Figure 8

Nara's Teacher Conversation #2 - Research Chart

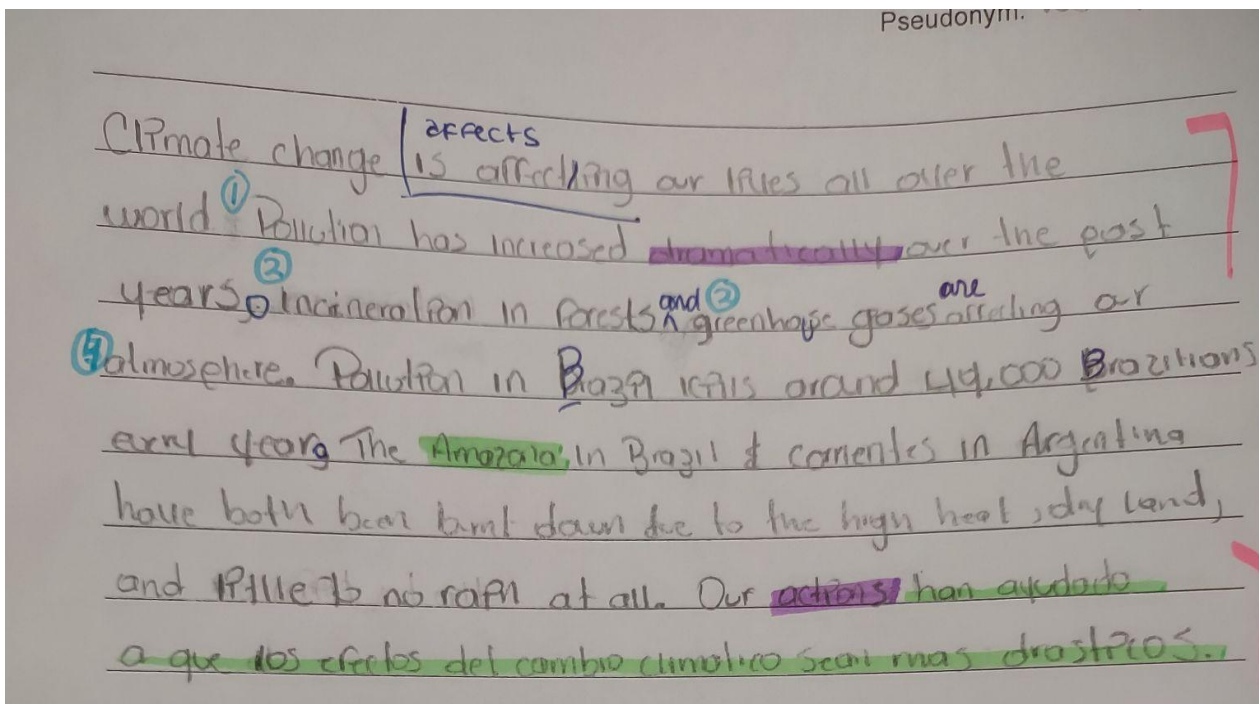
| | |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>What happens next?</p> | <p>- Many of the cities & towns are exploring alternatives to reduce their pollution production.</p> <p>- Programs to control sulfur dioxide (SO₂) from industrial sources & followed by nationwide standards for cleaner vehicles and fuels</p> <p>- Adoption of improved cookstoves would reduce PM_{2.5} exposure by over half and reduce the risk of disease & death by 30%</p> |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

Writing - CER format:

Air pollution in Brazil has increased more over the years and kills about 49,000 Brazilians every year. Rapid urbanisation and industrial development are a major cause for this. Many of the cities & towns are exploring alternatives to reduce their pollution production.

Figure 9

Nara's Post-Test



Nara's written production in her Post-Test reveals that not only can she use the target vocabulary effectively but also that she can connect these with content that was learned in the unit of work. In her paragraph, Nara uses four terms from the word box three of which are cognates, and also the terms "dramatically" and "actions" that are also cognates and afford more accuracy with regards to meaning. She connects what she learned about Brazil for Teacher Conversation #2 and what she learned about the fires in Corrientes, Argentina to develop strong reasoning. Finally, she sacrifices accuracy and grammaticality in English to express a more complex idea using her own knowledge and voice. Her last line also perfectly summarizes the reasoning: "Our actions han ayudado a que los efectos del cambio climatico sean mas drasticos" which translates as "Our actions

have [caused] the effects of climate change to be more drastic”. In this way, Nara was able to extend content knowledge and linguistic accuracy through the use of her language. While this poses a challenge for me as a teacher, those could be addressed eventually with the use of technology and via the systematic practice of translanguaging in the classroom.

Summary

Chapter four presented the findings and discussions that emerged from the analysis and observation of the data collected during the study. While quantitative data showed considerable growth in the number of participants who were able to achieve the objectives in the unit of work, qualitative data also supported these findings by illustrating the content comprehension and language extension attained through the strategies implemented in the unit. Qualitative data also revealed a disregard or disinterest from participants toward the use of their home languages at school. Such a disinterest could be attributed to participants’ (a) bi/multilingual exposure, (b) sense of agency, and (c) experience learning english. In line with these findings, translanguaging surfaces as a (a) multicultural and multilingual bid for lesson engagement, (b) space for community building and identity reconciliation, and (c) catalyst for academic language extension.

In the following chapter, I review the findings in light of my research questions: Does translanguaging impact the development of academic language? What are the challenges and successes of implementing translanguaging in a highly diverse classroom? Moreover, I discuss the most important outcomes of this study, as well as, some of its

implications and limitations. Lastly, I explore the final conclusions and areas for future research in connection with the discussions from chapter four.

CHAPTER FIVE

Conclusion

Introduction

This study was designed to examine the development of academic language and the comprehension of science-related content within a culturally responsive language and teaching framework —translanguaging. By integrating elements such as explorar (background building in students' home language) or presentar (use of home language in students' presentation for cultural accuracy), learning is expected to become more meaningful and student-centered. Therefore, the purpose of this study was to explore whether the integration of translanguaging at the levels of content, instruction, and production could foster the development of academic language among students.

On the other hand, the study aimed to better understand the different challenges, areas of success, and any other incidental reflections on the implementation of translanguaging in a highly diverse classroom. In doing so, this study explored the following research questions: *what are the impacts translanguaging has on academic language development? And, what are the challenges and opportunities translanguaging presents when implemented to learn content in highly diverse classrooms?*

Major Learnings

Both quantitative and qualitative data revealed that the implementation of translanguaging strategies impacted participants' work and performance throughout the unit. While quantitative data shows a growth in terms of lexis and structures, qualitative data supports these findings. It also shows how translanguaging inherently promotes

community building, identity reconciliation, and agency in learning development. This section aims at describing six major learnings concerning the findings.

Firstly, quantitative data showed that, in the pre-test, many participants used simple sentences or could not provide evidence or reasoning for their thinking. In the post-test, however, most participants provided their version and format of the CER paragraph. Thus, it could be suggested that the integration of translanguaging, even when solely at the instruction level, fosters an environment that is conducive to content comprehension and learning. In this regard, translanguaging seems to create an additional layer of manageable and achievable linguistic challenge that requires students' attention and engagement in the lesson. These two translate into improved pieces of writing at the word, sentence, and discourse levels.

Interestingly, those participants who engaged in translanguaging strategies throughout the unit all followed the Claim Evidence Reasoning (CER) format in the order provided. It could be speculated that these students gained a better understanding of the underlying logical construction. At the same time, it could also be suggested that the data reveals an increased sense of agency in these participants which might correlate with the implementation of translanguaging. The fact that these participants were able to state their claim first instead of beginning their explanation with a description of the picture (evidence) suggests that their own voice in the text is emerging. Conversely, in different assessments in the unit participants chose to copy or cite directly from sources, a practice that obscures their voice. Therefore, the implementation of a culturally and linguistically responsive framework such as translanguaging could serve the purpose of developing

students' voices in academic settings. Lastly, it is important to note that silence was a salient feature of the class throughout the unit which suggests that their voices are literally and metaphorically contained. Translanguaging lends itself to promoting the emergence of those voices.

However, it is essential to note that teachers and students may face specific challenges when incorporating this practice into their academic lives. The level of exposure to the languages and cultures, the access to resources, and participants' identities and experiences learning English appear to be the main barriers to viewing and understanding language diversity as an asset, not a deficit. These cultural and linguistic barriers are frequently tricky to overcome since the majority are external, therefore, sometimes beyond the control of the teacher or students.

The data collected in the study revealed how the lack of exposure and learning of the home language, the absence of agency, and the practices students engage in when learning English challenge the integration of translanguaging in a highly diverse classroom. Several participants in the study were bilingual but not bi-literate. Therefore, it was more difficult for them to, for instance, find resources in their home language—it did not make sense for them even to attempt to use a language other than English to complete a task. However, the study also revealed how participants' level of English proved insufficient to gain a more in-depth understanding of the content. In those cases, the knowledge of the home language was also not enough to act as a support. In addition, the general practices in which participants engaged when learning English did not foster the development of their voices. On the contrary, they prevented them from even coming

to the surface. Hence, practices such as copying directly from the sources without paraphrasing or adding their ideas proved detrimental to participants' development of agency in learning.

Notwithstanding the aforementioned challenges, there were also several areas of success and reflection. For instance, even when, in most cases, participants did not get to explore the full extent of the translanguaging practices, I would continue to integrate them because they promote engagement via a multicultural and multilingual experience. Additionally, translanguaging played a crucial role in developing a learning community that aided in identity reconciliation. Last but not least, aside from the cultural and ideological benefits of these practices, the study also showed that translanguaging has the potential to promote academic language extension.

To begin with, the implementation of translanguaging in a unit of work requires students' special attention to language to explore and deconstruct content. For this reason, I would argue translanguaging in this unit of work operated as a multicultural and multilingual bid for students' engagement. Participants like Mandevilla or Sada who decided to use resources in Somali necessarily engaged in a process of inquiry in the two languages, Somali and English, which resulted in a greater understanding of the topic and, in turn, greater ownership, command, and control over this content. Another interesting case is the one of Sanani, Salmee, Sada, and Sagal. The day we collaboratively completed the Teacher Conversation chart based on the resources I used to explain the fires in Corrientes, Argentina, participants accurately identified the meanings of terms. These participants were intrigued and engaged in the discussion

around language. In these discussions, we paid particular attention to the etymology of the words and their composition; we incorporated visuals and translations. The presence of translanguaging in this unit, then, required participants' attention more than in a monolingual environment. It also required a different form of attention as the presence of resources in another language added a layer of challenge and reflection.. In the long term, the integration of translanguaging could become a platform for metalinguistic discussions in the classroom where students can compare and contrast languages. They may be more likely to develop more command in their language of choice, a deeper understanding of languages and language structures in general, and increased access to specific content.

Furthermore, success was also attained in the collaboration generated due to community building. Working with peers who speak the same language was an integral part of this unit of work. It was interesting to see how Sanani and Salmee (Nepali) worked together even when they decided not to use their home language. They did, however, research an environmental issue taking place in Kathmandu, which is the place where both of them were born. Conversely, those students who did not have a language partner did not engage in collaborative work and instead chose to work individually. They also researched information about countries that are unrelated to their home culture. We could speculate that if implemented in the long term, translanguaging has the potential to become a space for linguistic and cultural healing. The data revealed in Keej's (Hmong) and Carlos' (Spanish) KWL charts also supports this idea. Both participants recognized that the use of their home language is allowed and encouraged. The teacher's validation and encouragement provide a space for students to reconcile the language and culture of

the home with those of the classroom. Hence, students have an opportunity to integrate their multiple linguistic and cultural identities in a way that honors their true selves.

In line with these findings, we could argue that the healthy integration of learners' multiple linguistic and cultural repertoires may catalyze academic language extension. Additionally, it may provide learners with skills and tools to develop their academic voices. By integrating the use of the home language, we model how the knowledge of multiple languages is an asset. For example, in his KWL chart, Carlos describes how he could incorporate more specific terms in his writing pieces as he remembered these terms in Spanish. As a result, he not only used more words from the word box in his post-test but also used more precise terms in his explanation overall. Conversely, Pyi Taw, who did not use translanguaging throughout the unit, showed a more limited range of vocabulary when describing processes or actors involved in them using vague terminology such as the word 'bad' or 'people'.

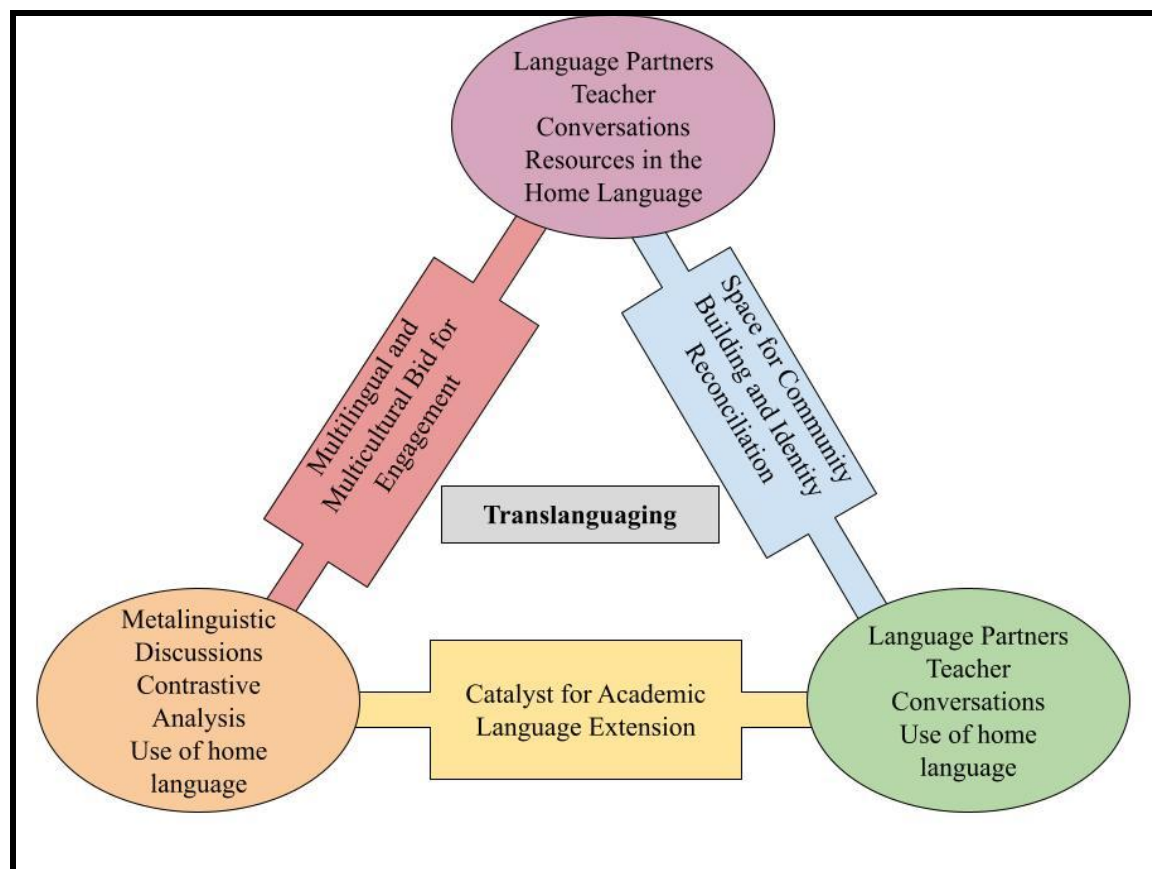
Another interesting example is the one of Nara (Spanish), who preferred to use resources in English when researching information for the Teacher Conversation #2 assessment. In this case, she copied information directly from sources without changing or paraphrasing any part. This practice, of course, does not allow me to see what she can really express in English herself nor her level of thinking in either language. In the post-test, however, when resources were limited to the word box, the picture, and the title, Nara displayed an interesting set of skills since she connected the information I shared, the one she found, and the ones from the picture to craft her explanation. When

she used translinguaging in her writing piece she not only was able to express a higher level of thinking in a more complex way but also developed her own voice in the process.

If these practices were implemented in the long term, Nara could obviously continue working on her text and eventually be able to express the ideas in English. What is important, however, is that she will have attained this knowledge by incorporating her previous one instead of rejecting it. In this way, these three major areas of success could operate in tandem to serve each other's purpose. Figure 10 illustrates how translinguaging strategies operate in a highly diverse classroom.

Figure 10

The Translinguaging Cycle in a Highly Diverse Classroom



Connections with the Literature

A presentation of the findings in light of the literature reviewed for this study show a strong connection between the data and experiences described in previous research. There are three main areas in which the literature serves as the framework for analyzing and explaining the data collected in this study: (1) learner's experiences in different classroom settings —particularly science, (2) negotiation and argumentation, and (3) translanguaging and its potential in a culturally and linguistically diverse high school classroom. The following section aims at describing how the findings are supported by previous research and how, in turn, they contribute to the multilingual studies field.

The first main area that appears in the literature is related to learners' experiences (learning English and content in English) in different classrooms, specifically in science or STEM classes. One of the key elements in the learning experience has to do with the environment. Participants in this study inhabit primarily monolingual classroom environments. Although there is a significantly diverse linguistic landscape at the school, this is not the case in academic settings let alone at the level of instruction. According to the literature reviewed, it is very often the case that despite students' multilingual backgrounds, they inhabit monolingual English spaces (Vaish, Jamaludeen, & Roslan, 2009, as cited in Seah & Silver, 2020). In these spaces, linguistic varieties are not accepted by teachers, administrators, or policymakers as appropriate for academic settings (Silver, 2005, as cited in Seah & Silver, 2020).

Moreover, when looking specifically at the five discourse patterns that can foster or impede academic language development, the questioning pattern is one that best

illuminates one of the findings in this study. The study was mainly characterized by silence and a preference for individual work for a group of participants (those who did not have a language partner and Yabee). At the same time, when asked questions to initiate processes of inquiry, though participants were accurate they were not detailed. They very often prefaced their answers by saying “I don’t know” only to later give a concise but accurate answer. We could speculate that participants are not used to engaging in complex processes of thinking or are not used to answering higher-order thinking questions in other classes. Zwiers (2007) showed how teachers would ask ELL students to engage more in cause/effect or comparison than in more complex discourse patterns. Likewise, questioning patterns should vary from yes/no to critical thinking questions. For this reason, when asked high-order questions participants found it more challenging and would be more likely to preface their responses with “I don’t know”.

Zwiers (2007) also noted ELLs often do not add to other people’s points in discussions because they are used to answering when they are certain they have guessed what the teacher wants them to say i.e. they know the right answer. When arguing, the challenge for ELLs is not (only) the lack of language but also the reluctance to participate unless they can say what they are expected to. Units of work like the one described in this study do not offer much room for the type of questions in which there is only one possible answer. In general, questions were open-ended and required participants to think of reasons and evidence to support their claims. At the same time, it is interesting to know how this interest in saying or answering what the teacher wants students to answer also seems to be reflected in data collected from participants in this study. They tend to

preface their responses by saying “I don’t know” and a number of participants engaged in copying directly from the sources they researched. These practices and behavior reflect how learners are not agents in their learning processes.

The second main area in which the literature supports the findings in this study is that of negotiation and argumentation. Ardasheva, Norton-Meier, and Hand (2015) identified negotiation, embeddedness, and non-threatening learning environments as three ways in which learners can develop comprehension via social interaction. Researchers also described how negotiation, in particular, is fundamental in the practice of scientific inquiry and public or private knowledge co-construction. In this case, then, it is important to know how the data reveal that participants who did not engage in group tasks used, for instance, less accurate vocabulary in their post-tests than those who worked in groups throughout the unit. On the other hand, argumentation also plays a key role in the development of comprehension but also of identity in socialization. This process requires that learners share, share, evaluate, critique, and refine their tentative arguments through public debates (Walker et al., 2011, as cited in Ardasheva, Norton-Meier, & Hand, 2015). In this regard, it is worth noting that those participants who did not engage in group discussions and activities as much or at all, experienced a lower growth overall compared to their peers who did. In assessments such as the Teacher Conversation, for instance, these participants did not go through the process of evaluating, critiquing or refining.

The third and last main area in which the literature reviewed supports and accounts for the findings in this study is that of translanguaging as an ideological stance and a teaching and learning framework. Translanguaging has a potential in the world of

education because it understands: (a) language as a space for creativity, (b) language learning as the construction of linguistic identity, and (c) the classroom environment as a space that is responsive to cultural and linguistic diversity (e.g., Garcia, 2009; Garcia & O'Sylvan, 2011; Poza, 2014; Garcia & Vogel, 2017; Garcia, Johnson, & Seltzer, 2017; Li, 2018; Velasco & Garcia, 2014). Translanguaging's potential is confirmed by the findings in this study in all three spaces. At the same time, according to Li (2018), translanguaging also appears as a theory of language practice. This understanding of translanguaging implies that teachers and learners engage in a process of practice-theory-practice. Lastly, translanguaging as a pedagogical stance builds on social justice and collaboration to promote changes in society at large (Garcia, Ibarra Johnson, & Seltzer, 2017). Translanguaging's potential as a theory of language practice and as space for social change is corroborated by the findings in this study as well.

The data collected in this study revealed how translanguaging impacted participants' identity, academic language use and growth, and the overall community built in the classroom. These findings perfectly align with the three core beliefs translanguaging upholds: (1) students' language practices and cultural understandings combine those brought from home and those acquired at school; (2) families and communities are a vital source of knowledge; and (3) the classroom is a democratic space and as such, it challenges status quo to build a more just society (Garcia, Ibarra Johnson, & Seltzer, 2017). Of the three core beliefs, maybe the most salient in relation to this study is the third one. Carlos' and Keej's KWL charts showed how having incorporated resources in my home language for teaching and learning served as a model for them to

learn how to do it. However, and most importantly, my own use of translanguaging signaled the incorporation of home languages in the classroom is not only allowed but also encouraged.

Velasco and Garcia (2014) suggested that when developing their final products, learners use translanguaging to engage their audience rhetorically and demonstrate the complexity of their repertoire. This is how learners develop agency and fulfill their desire for identity (Caranajah, 2011). This specific piece that emerges from the literature review supports the findings in Nara's post-test writing pieces. Although her use of Spanish in it is not an element for rhetorical engagement, she does use it to show the actual complexity of her thinking. In doing so, she manages to craft a paragraph that brings together her own voice and the content learned in the unit.

Implications

In line with the findings and the literature, this study presents implications for teachers, students, and the school community including but not limited to families, administrators, and staff members. In the case of teachers, this study sheds light on the key elements for academic language development. Contrary to the practices students are used to engaging in at school, practices and strategies that incorporate cultural and linguistic previous knowledge could work as a more effective platform to foster this development. Additionally, for students, this study reveals the impact of an underdeveloped or lost home language in terms of overall language growth and agency in learning. Finally, for the school community, the implication is that although language development may seem like the result of individual effort, it, in fact, requires the

commitment and involvement of the whole community and stakeholders for that development to be effective.

The present study reveals that the implementation of a culturally responsive framework such as translanguaging has many implications for the teacher in that their role and praxis are directly intersected by it. This implementation demands that the teacher exposes their vulnerability and allows students to command specific portions of the unit of instruction. It is crucial for the teacher to become a learner, too, for students' cultural and linguistic backgrounds to actively serve the learning processes in the classroom. Therefore, this poses the question of how to begin this type of implementation. In this regard, I would argue that a *soft* incorporation is better than no incorporation at all. *Soft* translanguaging would be an appropriate first step for the skeptical teacher. This would entail, for instance, promoting the use of resources in students' home languages or encouraging students to take notes or study using their home languages as well. In turn, teachers would not only be promoting a multicultural and multilingual learning environment but would also be fostering autonomy and student-centeredness. While some would argue that the teacher would not be able to supervise these contents or notes, it is worth asking whether teachers should have to oversee these when they are meant to be for the students' benefit only.

Limitations

There are some limitations to this study which involve participants' absenteeism and tardiness to class, their interactions with technology and devices, and their overall state. Several participants in the study were either absent or tardy to class at least once

during the study which could impact the quality of their performance. On the other hand, the presence of devices such as tablets and phones in the classroom - useful media to research information - could be a double-edged sword in that learners' attention may be overtaken by them. Lastly, participants' performance may have also been influenced by participants' sleep deprivation.

During the study, I noticed that those participants who preferred to work individually also had a tendency to listen to music with their ear pods while writing. This may have negatively influenced the quality of their pieces of writing. At the same time, participants were often reminded to not be on their phones or social media during the lesson. Still, they showed a strong need to permanently check their phones, and their attention and engagement in the lesson, thus, wavered. For this reason, the use of devices was strategically incorporated into the KWL or Teacher Conversation charts. This dichotomy may have been difficult to balance for some participants.

Another limitation was identified with regards to participants' sleeping patterns, deprivation, and levels of attention in the lesson. A significant number of participants commented they went to sleep between 12 am and 2 am. Participants should arrive at school no later than 8:10 am. This means that if they go to sleep at 2 am they are only getting between 5 or 6 hours of sleep in the best-case scenario. Participants' ability to respond to higher-order thinking tasks could have been significantly impaired by the hours of rest participants got on the days the study was performed. At the same time, sleeping patterns and deprivation were also reflected in participants' tardiness to class. Late arrivals were mostly associated with participants' sleeping past their wake-up time.

Participants' performance may have, therefore, been impacted by their arriving late to class and missing part of the discussions.

Future Research

There is data that raised questions and reflections that go beyond the scope of this study and, therefore, would warrant further research and interpretation in these specific areas. For instance, quantitative data shows participants use simple sentences more than any other type of sentence. Future research on the impact of this linguistic structuring on participants' level of thinking and vice versa. Can participants engage in complex levels of thinking if they cannot put that thinking into spoken or written text? If participants have not developed literacy in their home language and their practices around learning English involve the use of mostly simple sentences or copying directly from sources, how critical can participants actually be with regards to their thinking? It would, then, be interesting to explore the correlation between language development and critical thinking.

Areas for future research also emerge regarding translanguaging and its implications in different educational settings. For example, the emergence of challenges around the implementation of translanguaging in highly diverse classrooms begs the question of whether these challenges can be overcome and if so, how. At the same time, it would be interesting to replicate the study while tackling different content areas and compare and contrast the findings in order to assess differences and similarities. Additionally, it would be crucial to identify those elements that cannot be omitted in order to achieve success.

Last but not least, future research should involve revisiting the purpose of EL instruction and redefining its scopes and essentials so that they match the experience of multilingual and multicultural learners in 21st-century classrooms. These classes should require students to engage in processes of research and inquiry led by them. It would be important, then, to collect data from different EL classrooms in order to have a clearer understanding of the needs and experiences of the learners as active members of a school community. Research in this area could then call for the implementation of more culturally and linguistically responsive approaches to teaching and learning such as translanguaging so learners' life experiences can better relate to their academic ones.

When considering translanguaging, however, it is worth noting that it has its resistance and its implementation is more nuanced than we might think. The implementation of these levels of translanguaging could be resisted by teachers, both mainstream and EL, and by students as well because of its political and ideological nature. For this reason, even the development of a new term could be warranted in this case in favor of the implementation of a culturally responsive framework that could better serve the needs of highly culturally and linguistically diverse populations in the high-school classrooms.

Communicating the Results

There are two main ways in which I plan to share and communicate the results. On the one hand, I will create a Slides presentation featuring the bar chart, tables, and assessments including the data collected. I will provide explanations and descriptions of the data shown as well as my own interpretation of the themes that emerged from the

literature reviewed and the findings. This presentation will be shared with the multilingual administrator at the district level. On the other hand, I believe it is important to share these findings with the ESL community at large. For this reason, I would like to present my findings at the Minnesota English Learner Education (MELEd) Conference organized by MinneTESOL (an association of teachers of English as a Second Language in Minnesota and neighboring states) in November 2022. The purpose of this conference is to share findings and innovative practices in English teaching and learning. In the recent years, the focus of the conference has been multilingualism and its development in the classroom. The MELEd 2019 Conference was the one in which I learned about translanguaging for the first time so, I believe this would be the perfect space and opportunity to communicate the results of my study.

Conclusion

The purpose of this study was mainly to explore the development of academic language in the context of a content lesson through a lens and framework that better explains my own experience as an English learner: translanguaging. Translanguaging has been widely studied in bilingual settings and the benefits of its implementation are often described in terms of the skills learners develop around all the named languages in their translanguaging corrieinte (their full linguistic and cultural repertoire). The research questions in this study guided the research and illuminated the emergent themes: what are the impacts of translanguaging in academic language development among ELLs? What are the challenges and successes of the implementation of translanguaging in a highly diverse high school EL classroom? This study closely looked at the modeling and

implementation of some translanguaging strategies in a highly diverse classroom (multiple languages and levels of literacy in them). When doing so, I found that there was a generalized disregard for the knowledge and use of participants' home languages, preference for individual work over collaborative or group work, and low sense of agency in learning.

The translanguaging proposal, then, challenged those characteristics by providing participants with an opportunity to actively engage in lessons, go beyond their levels of language, and reflect metalinguistically on the use and structure of language. In many ways, this study was the process of systematizing participants' languaging processes. In doing so, we recognized and honored the inherent value of knowing multiple languages while unveiling the power that comes with it—a power participants always had but had to learn to *see* it. When this happens, teachers, instead, have the opportunity to *let go* of the power to control how students learn while encouraging them to embrace and grow their own identity.

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APPENDIX A

Table A1

Unit of Work - Pollution and Climate Change

| | | |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Grade Academic Writing 10-11 | Genre: Textbook / Reference Text Text Form: Explanation | Content Connection: Students will be able to make a claim about the causes and effects of climate change, give evidence, and describe the reasoning for their thinking using the CER format. |
| Planning for Instruction and Assessment and Knowledge about the students/cultural considerations | | |
| <p>Participants in this study are high school EL students at a high level (4.5-5.0) Academic Writing class. Students in this class range in age (10th and 11th graders), level of expertise, and background knowledge of the content to be studied. This class is highly diverse with most students coming from different backgrounds and experiences in their education processes as well as in the development of their multiple languages (English, and the languages spoken in their families - Somali, Burmese, Nepali, Hmong, Spanish, Amharic, Lisu, Karen, Arabic). They are generally a very quiet group and have difficulty participating actively and spontaneously but they respond very well to the different activities and to the direct explanations about language (language focus). At the same time, they have demonstrated very strong writing skills in terms of spontaneous/ free writing.</p> | | |
| Essential Questions | <ol style="list-style-type: none"> 1. What is the Claim, Evidence, and Reasoning model? 2. How do we use the CER model to explain the causes of pollution and climate change and their effect on the environment? | |
| Content Standards Minnesota Standards for Science Strand 3 Developing possible explanation of phenomena or designing solutions to engineering problems Substrand | Uncoached prompt What phenomenon(a) is causing the effects you see in the picture? Write 1 (one) paragraph (7-10 lines) to explain the phenomenon you see in the picture. Make a <i>claim</i> about what you see, give <i>evidence</i> to | Language Features (3-5) Organizational structure explanatory text Discourse level Functions: Explain (Claim - Evidence - Reasoning) Sentence level Word level |

| | | |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|--|
| <p>3.2 Constructing explanations and designing solutions</p> <p>Standard</p> <p>3.2.1 Students will be able to apply scientific principles and empirical evidence (primary or secondary) to explain the causes of phenomena or identify weaknesses in explanations developed by the students or others.</p> | <p>support your claim, and provide <i>reasoning</i> for your thinking.</p> | |
| <p>WIDA ELP Standards</p> <p>WIDA ELD Standard 2 Language for Language Arts ELD-LA.9-12.Argue.Expressive</p> <ul style="list-style-type: none"> - Introduce and develop precise claims; - Logically organize claims, counterclaims, reasons, and evidence; <p>WIDA ELD Standard 4 Language for Science ELD-SC.9-12.Explain.Interpretive</p> <ul style="list-style-type: none"> - Evaluating the extent to which reasoning, theory, and/or models link evidence to claims and support | | |

| | | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>conclusions WIDA ELD Standard 4 Language for Science ELD-SC.9-12.Explain.Expressive</p> <ul style="list-style-type: none"> - Describe reliable and valid evidence from multiple sources about a phenomenon - Develop reasoning to illustrate and/or predict the relationships between variables in a system or between components of a system | | |
| <p>Content Objective(s) SWBAT Discuss the relationship between pollution and climate change and the effects both have on the Earth.</p> | <p>Language Objective(s) SWBAT Write a paragraph making a claim, giving evidence, and providing reasoning for their thinking using Tier 2-3 words and various conjunctions.</p> | <p>Translanguaging Objectives SWBAT Use their home language for planning and drafting their paragraphs in multiple ways (translations, use of words that they do not know, content, etc.)</p> |
| <p>Culminating task/learning goal (what will the students produce by the end?)</p> <p>Research 1 (one) environmental issue, its underlying causes, and effects. Write an email to a local representative making a claim about an environmental topic, giving evidence, and providing reasoning for your thinking. Demand action is taken to prevent further ecological damages.</p> | | |
| <p>Building the Field/Deconstruction</p> | | |

| | | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Which 3 - 5 mentor text(s) will be utilized? How will these texts be used? | | |
| Video - Fires in Corrientes, Argentina CER textbook unit | | |
| Building Topic Awareness: <i>KWL</i> <i>Chart</i> | Building Genre Awareness Students identify common patterns and features in explanatory texts. Students look at pictures of different environmental disasters caused by climate change. Students watch videos in their home language about climate change. | Strategies for deconstruction Sort the different parts of the text into Claims, Evidence, Reason. Teacher Conversations: Explaining terminology and assigned content. |
| Joint Construction of Text | | |
| Strategies for Joint Construction Interactive writing Shared writing Edit/Revise a non-exemplar piece of writing Reorder chunks of text | | |
| Independent Work and Evaluation of Learning | | |
| Strategies for Independent Construction Conferring/feedback Student-led (independent, pairs, small groups) Evaluation tool (success criteria checklist/rubric) | | |

Note. TLC and Translanguaging

APPENDIX B

Table A2

Pre/Post-Test Rubric

| | Discourse Level | Sentence Level | Word Level |
|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Claim | <p>Organization of language Text that conveys intended purpose using genre-specific organizational patterns (claims)</p> <p>Cohesion of language A variety of cohesive devices used in genre-and-discipline-specific ways</p> <p>Density of language A wide variety of types of elaboration and some ways to condense ideas that includes embedded clauses and condensed noun groups through nominalization</p> | <p>Grammatical complexity Uses simple sentences Uses compound sentences Uses complex sentences Uses complex compound sentences Uses the conditional structures Uses cause and effect conjunctions Uses comparative and adversative conjunctions Does not use conjunctions Uses other sentence structure: (describe)</p> | <p>Precision of language Uses words in the word box accurately Uses the words in the word box inaccurately Does not use the words in the word box Uses other Tier 2 or 3 terms accurately Uses other Tier 2 or 3 terms inaccurately</p> |
| Evidence | | <p>Grammatical complexity Uses simple sentences Uses</p> | <p>Precision of language Uses words in the word box accurately</p> |

| Reasoning | Grammatical complexity | Precision of language |
|-----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | compound sentences Uses complex sentences Uses complex compound sentences | Uses the words in the word box inaccurately Does not use the words in the word box Uses other Tier 2 or 3 terms accurately Uses other Tier 2 or 3 terms inaccurately |
| | Uses simple sentences Uses compound sentences Uses complex sentences Uses complex compound sentences Uses the conditional structures Uses cause and effect conjunctions Uses comparative and adversative conjunctions Does not use conjunctions Uses other sentence structure: | Uses words in the word box accurately Uses the words in the word box inaccurately Does not use the words in the word box Uses other Tier 2 or 3 terms accurately Uses other Tier 2 or 3 terms inaccurately |

| | | | |
|------------------------|-------------------------------------------------------------------------------------|----------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|
| | | (describe) | |
| Translanguaging | Refers having used knowledge of content in home language to write the paragraph | Refers having translated sentences from the home language into English | Refers having used words in their home language when they did not know the terms in English |
| | Refers not having used knowledge of content in home language to write the paragraph | Refers not having translated sentences from the home language into English | Refers not having used words in their home language when they did not know the words in English |

Note. Claim, Evidence, Reasoning (WIDA ELD Standards) + Translanguaging (The

Translanguaging Classroom)

APPENDIX C

Table A3

Observation Rubric

| Stages | Successes | Challenges | Incidental |
|----------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| Building Background/ Explorar <i>KWL Chart</i> | Use of Translanguaging at the level of Vocabulary Content Oral expression Written expression | Little to no use of Translanguaging at the level of Vocabulary Content Oral Expression Written Expression | Emerging reflections about Translanguaging at the level of Vocabulary Content Oral expression Written expression |
| Building Background/ Explorar <i>Teacher Conversations</i> | Use of Translanguaging at the level of Vocabulary Content Oral expression Written expression | Little to no use of Translanguaging at the level of Vocabulary Content Oral Expression Written Expression | Emerging reflections about Translanguaging at the level of Vocabulary Content Oral expression Written expression |
| Joint- Construction/ Evaluar <i>Research Chart</i> | Use of Translanguaging at the level of Vocabulary Content Oral expression Written expression | Little to no use of Translanguaging at the level of Vocabulary Content Oral expression Written expression | Emerging reflections about Translanguaging at the level of Vocabulary Content Oral expression Written expression |
| Independent Construction / Presentar | Use of Translanguaging at the level of | Little to no use of Translanguaging at the level of | Emerging reflections about Translanguaging at |

*Planning and
Drafting*

Vocabulary
Content
Oral
expression
Written
expression

Vocabulary
Content
Oral
expression
Written
expression

the level of
Vocabulary
Content
Oral
expression
Written
expression

Note. Based on WIDA ELD Standards and the Minnesota Standards for Science

APPENDIX D**Pre/Post-Test****Instructions**

1. Look at the picture and the headline
2. Consider your previous knowledge on this phenomenon, the evidence you can obtain from the picture and the headline, and your reasoning to think of a possible explanation for this phenomenon.
3. Write **1 (one)** paragraph (7-10 lines) to explain the phenomenon you see in the picture. Make a *claim* about what you see, give *evidence* to support your claim, and provide *reasoning* for your thinking.
4. You can use your home language to plan or draft your paragraph.
5. You can use your home language when you do not know specific terminology in English.
6. Use the following words in your answer:

Word Box

pollutants - sediment pollution - thermal pollution - pesticides - atmosphere - greenhouse effect
- incineration - greenhouse gases - carbon footprint

Headline

How Far Will We Go with Climate Change?

Picture



Source: <https://currentworld.news/politics/how-far-will-we-go-with-climate-change/>

Writing task: *Claim, Evidence, Reasoning*

- 1 (one) paragraph (7-10 lines)
- Use of home language
- Use of words in the word box

APPENDIX E

Unit 4: Pollution and Climate Change

1. Think about yesterday's Pre-Test.
2. What do you currently know about the topic(s) of the unit?
3. What do you currently know about the Claim, Evidence, Reasoning (CER) format?
4. Based on the challenges posed by the Pre-Test, what do you want to know more about? What do you want to learn?
5. Fill in the following KWL chart with as many details/information as you can using the guiding questions.
6. You can use your home language if there are ideas or terms that you can better express in it.

| K (know) | W (want to know) | L (learned) |
|----------|------------------|-------------|
| | | |

APPENDIX F

Unit 4 - Teacher Conversations

1. Work in your language group.
2. In this activity you will be the teacher.
3. Choose 1 (one) of the terms from the vocabulary list you did in the previous activity.
4. Look for information about the term using the language of the group.
5. Fill in the chart with all the information you need to explain the term.
6. Find and partner from a different group and use your chart to explain the term.

| | Description |
|-------|--------------------|
| What | |
| Where | |
| When | |
| Why | |

| | |
|--------------------|--|
| | |
| What happens next? | |

APPENDIX G

Unit 4 - Teacher Conversations

1. Work in your language group.
2. In this activity you will be the teacher.
3. Choose 1 (one) environmental issue that is related to the topic of the unit. This should be taking place in a different part of the world other than the U.S.
4. Look for information about the issue using the language of the group.
5. Fill in the chart with all the information you need to explain the issue. You may use translation and resources in your home language. You may also use your home language for planning, drafting, and writing.
6. Write an explanation to the issue using the CER format.
7. Find and partner from a different group and use your chart to explain the term.

| | Description |
|-------|-------------|
| What | |
| Where | |
| When | |

| | |
|--------------------|--|
| | |
| Why | |
| What happens next? | |

Writing - CER format:

APPENDIX H

Research Study - Teacher Journal

Day 1 - Pre-Test

The research study began with a lot of commitment and excitement on my end and on students' end as well. On day 1, I gave students the pre-test, read the instructions with them and encouraged them to a) do the best they can using their previous knowledge, b) use their home language if they wish to. One student, VS, who generally does not have difficulty writing, reported he found it difficult to write just having the word bank, headline, and picture as support. A good number of students wrote more than they were instructed.

Day 2 - Pre-Test & KWL Chart

Students completed the KWL chart by writing what they knew about pollution and climate change and posed questions about these topics as well.

Disengaged (AB, JC) / Use of native language (SE, SY, MH)

Day 3 - Teacher Conversation #1

Today's lesson was quite challenging. I organized the classroom in stations (Spanish, Hmong, Nepali, Somali, Many - all the languages that do not have enough students to pair up). Students were late to class due to weather conditions. 6 out of 18 students were absent (1 Spanish, 1 Somali, 2 Hmong, 1 Lisu, 1 Arabic). Therefore, I delayed the beginning of the lesson and students used this time to work on a creative activity. When the lesson began there were 3 Somali, 2 Spanish, and 2 Nepali speaking students and 5 students who were in the group called "Many" (1 Amharic, 1 Karen, 1 Burmese, 1 Karenni, 1 Hmong). The lesson proceeded as follows:

1. Vocabulary activity
 - a. Students had to match the terms from the word bank in the pretest to the pictures. I wanted them to confer in their home languages. I was not that interested in their knowing the terms in their home languages but I simply wanted them to have the freedom to work in the language they wanted particularly if that was something they felt comfortable with. The group called many was encouraged to discuss in English. They did not talk as a group and worked on the vocabulary activity individually. I wonder if knowing that the rest of the students were grouped in language groups deterred them from speaking to each other "because they do not share the same

language”. However, this particular group is among the students who participate the least.

- b. From the beginning of the study I have noticed that except for 1 to 4 students, the remainder of students have no interest in using their home languages. The majority of the students are bilingual but not biliterate (they do not know how to read or write). The majority of the students speak the home language only with their parents or grandparents, and/or maybe a few friends.
 - i. Spanish - yes
 - ii. Somali - yes
 - iii. Nepali - no
 - iv. Many - no
 - v. 1 out of 2 of the Spanish speaking students who were present preferred to speak in English even with his siblings.
 - vi. 1 out of 2 Nepali speaking students reported he would only speak Nepali if the room were full of Nepali speaking people. The fact that he was working with a partner who spoke Nepali but also English made him lean towards English.

2. Teacher Conversation

- a. Research information. Students researched information about the topic they were assigned.
- b. Complete the chart. Students completed the research chart with information. Somali students spoke and looked for information in Somali. Spanish speakers spoke and conferred in Spanish. Nepali used English throughout the activity. The Many languages station used English throughout the activity.
- c. Talk to a partner. Students did not get to this part of the lesson.

Day 4 - Teacher Conversation #1 Continued

Teacher Conversation #1

Whole class clarification of terms - Vocabulary Worksheet

Pair and Share

Day 5 - Direct Instruction: CER Format

Quick Write - What is a claim? What is evidence? What is reasoning?

CER Format - Part 1

Learn it and Try it

Instruction was fully in English and students answered questions that would probe their understanding of the topic. The only answer when nominated. All students preferred to work individually. Prolonged silence.

Day 6 - Direct Instruction: CER Format

Oral review - claim - statement, opinion + fact / evidence - proof / reasoning - logical connection, logical appeal, compare and contrast relations, cause and effect relations

CER Format - Part 2

Review it and Conquer it

Instruction was fully in English and students answered questions that would probe their understanding of the topic. The only answer when nominated. All students preferred to work individually. Prolonged silence.

Day 7 - Collaborative Teacher Conversation

Grammar Check - Modals

Teacher Conversations - by Ms Borre

- Show videos
- Complete research chart with help of Spanish speaking students
 - During the part of the lesson in which we watched the videos in Spanish, Carlos and Nara were watching and they were engaged but did not feel confident enough to share what the terms were for them.
 - We discussed the causes and effects of the fires in Corrientes, Argentina. The fires are caused primarily by the droughts and the droughts are caused by the lack of precipitation. The root cause is that wetlands are disappearing as a result of climate change; there is not enough water so there is not enough rain.
 - S, S, S, S answer the meanings of the words in Spanish. We discuss the etymology of these words.
 - Humedales = wetlands → they say humidity
 - Precipitaciones = precipitation
 - The video had lots of numbers and percentages paired with visuals
- Model CER with information from chart

Day 8 - Teacher Conversation #2

Teacher Conversations #2 - By Students

- We watch the video and complete a research chart together
- Filtracion = filtration (S)
- Ecosistemas naturales = natural ecosystems (S)

Research topic

- Students choose a topic and a country or region to research.

Research Chart

- Students complete the research chart. Students who are in language groups share information and talk to each other. Students who do not have a language pair are generally very quiet. They choose to work individually. They listen to music while they work.

Day 9

Paragraph writing - CER format

- Some students wrote their paragraphs, some others devoted more time to doing the research. All students had the opportunity to share the information they researched.

Teacher Conversations - share

Day 10

Post-Test was completed without any difficulties. The test ran smoothly and in the typical silent environment.