English Language Education

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Teaching the Content Areas to English Language Learners in Secondary Schools

English Language Arts, Mathematics, Science, and Social Studies

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Contents

Language-Content Integration Across School Subjects: Approaches to Teaching English Language Learners

Luciana C. de Oliveira, Kathryn M. Obenchain, Rachael H. Kenney, and Alandeom W. Oliveira

Abstract This chapter provides an introduction to the present book. In an effort to provide practitioners with guidance on such pedagogical endeavor, this collection examines how the educators of varied academic disciplines (English language arts, mathematics, science, and social studies) approach the creation and implementation of curriculum spaces at the intersection of language and content. Our vision for this book was one of theory-based practice wherein descriptions of pedagogical approaches were accompanied by explicit accounts of the authors' theoretical underpinnings and epistemic/linguistic stance.

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1 Background and Rationale

English language learning has become a ubiquitous and integral aspect of content teaching in middle and high school. Increasingly, teachers of school subjects as varied as English language arts (ELA), science, mathematics, and social studies are expected to be able to pedagogically give English Language Learners (ELLs) access to disciplinary-based instruction. This is particularly evident in the recent development and adoption of the Common Core State Standards for English Language Arts and Literacy in History/Social Studies, Science, and Technical Subjects (CCSS-ELA/Literacy), the Common Core State Standards for Mathematics, the C3 Framework for Social Studies State Standards, and the Next Generation Science Standards (NGSS). All of these educational policies highlight the role that content teachers have in developing ELL's discipline-specific competencies.

Central to this 'language across the curriculum' approach (Cross, 2016) is a shift from a separate language-dedicated classroom to wider curriculum spaces wherein language and content are integrated and coexist harmoniously across all school subjects. Teachers of academic disciplines must skillfully use content as a space for ELLs to learn an additional language in contextualized and purposeful ways. This requires not only familiarity with new and innovative approaches for teaching different subjects to ELLs, but also a broader understanding of the mediating role and place of language across a variety of integrated curriculum contexts. Teaching language across the curriculum requires pedagogical expertise in the design of language-content curriculum spaces unconstrained by traditional disciplinary boundaries.

In an effort to provide practitioners with guidance on such pedagogical endeavor, the present book examines how the educators of varied academic disciplines (English language arts, mathematics, science, and social studies) approach the creation and implementation of curriculum spaces at the intersection of language and content. Informed by current research and theory from various educational fields, this examination is ultimately aimed at informing ways whereby teachers of varied school subjects can coordinate their efforts in order to effectively realize and deliver the promise of 'language across the curriculum'. Our vision for this book was one of theory-based practice wherein descriptions of pedagogical approaches were accompanied by explicit accounts of the authors' theoretical underpinnings and epistemic/linguistic stance. This book offers practical guidance that is grounded in relevant theory and research and offers teachers suggestions on how to use the approaches described herein. Reflection questions help readers consider the various ways that content and language can be integrated and promoted at the secondary level.

2 Taking Down Disciplinary Walls

Previous books on content-language integrated teaching have been too narrowly focused on supporting English language learners' acquisition of academic content within the epistemic confines of individual school subjects. Aligned with traditional disciplinary-based approaches to school instruction, this literature has been mostly constrained by disciplinary boundaries that have been increasingly criticized for its highly arbitrary and problematic nature. As Scheffer (1991) writes "we divide the matter of education into familiar 'subject' categories and think thereby to have simplified and clarified the task of teaching… what could be more familiar or more misguided?" (p.71). Such a recognition has, in recent years, led to widespread adoption of pedagogical approaches that cross traditional disciplinary boundaries such as socioscientific argumentation (science and social studies), STEM (Science-Technology-Engineering-Mathematics), STEAM (STEM + Arts), the Science Writing Heuristics (science and language arts), history of science, and history of mathematics. In addition, the emergence of co-teaching models (Honigsfeld & Dove, 2010) through which language specialists and content-area specialists/teachers seek to collectively meet the needs of English language learners further highlight the need for a resource that is unconstrained by disciplinary division. This is precisely what sets this book apart from previous publications. As a multidisciplinary resource, this unique book will provide educational practitioners and researchers with a broader understanding of research-informed practices used to teach different content areas to English language learners, and hence help them better navigate disciplinary boundaries at the middle and high-school level.

3 North America Emphasis

Chapters in this book are predominately from educators based in the United States and Canada. Most chapters are rooted in U.S. learning standards and educational policies. Nonetheless, they tackle pedagogical issues with varied degrees of similarity to those found in many other countries and its insights are likely to be applicable to a wide range of contexts, including ones where the instructional language is not necessarily English. Although this particular context is privileged in the book, we fully acknowledge that the issue of effectively helping students overcome language obstacles to content learning is of worldwide interest, and reaches far beyond the English-speaking world. As such, this book will likely be of great interest to educators in different parts of the world beyond North America.

4 Terminology and Acronyms

One particularly challenging aspect of putting together an edited volume like this is with regard to the terminology used to identify the target student population with whom the authors of each separate chapter set out to work. Part of the reason is that there is little agreement in the scholarly literature as to what name best describes these students. Each designation has different connotations and problems, with different terms being favored by researchers within distinct research traditions depending upon one's philosophical commitment, sociopolitical orientation, and unique focus. These include emergent bilingual, bi/multilingual students, additional language speaker, English language learner (ELL), English learner (EL), Limited English Proficient (LEP), non-native speaker (NNS), L2 speaker, etc.

In an effort to increase the overall coherence of the volume and create consistency across chapters, we worked with authors on reducing variation in the terminology, without imposing a particular term or standard acronym that may make them uncomfortable. Toward this end, we asked authors to use "English Language Learners" (ELL) since this was the term used in the book title, but made exceptions when authors strongly objected to this term. As a result, most chapters adopted to use the acronym ELLs (English Language Learners), but other terms were used as terms of choice more closely aligned with authors' sociopolitical convictions.

5 Book Format and Organization

This practitioner-oriented book is divided into four sections representing the following content areas: English Language Arts (chapters "Multimodal Literacies in the English Language Arts Classroom for English Language Learners", "From Words to Thematic Text Analysis: Collocation Activities as Academic Vocabulary Building Strategies in the Middle and High School ELA Classroom (Grades 6–12)", "A Genre-Based Approach to Teaching Argument Writing", "Six High-leverage Writing Practices for Teaching English Language Learners in English Language Arts", and "Using Multicultural Nonfiction and Multimedia to Develop Intercultural Competence"), Mathematics (chapters "Keying English Learner Students into Mathematical Content: The *Things I Notice* Approach", "Doing and Talking Mathematics: Engaging ELLs in the Academic Discourse of the Mathematical Practices", "A Framework for Improving the Teaching of Mathematics to Bi/Multilingual Learners", "Culturally Supporting Latinas and Korean Girls in Mathematics", and "Linguistically Responsive Teaching to Foster ELL Engagement, Reasoning, and Participation in a Mathematics Discourse Community"), Science (chapters "Activating Bilingual English Language Learners' Strengths in Science: The Pedagogy of Argument Driven Inquiry (ADI)", "Supporting English Language Learners Through Inquiry-Based Science: Three Strategies for Your Classroom", "Engaging English Language Learners in Model-Based Science Instruction",

"Scaffolding English Language Learners' Literacy Development Through a Science Inquiry Approach", and "Using Communication Models to Teach ELLs Science"), and Social Studies (chapters "Engaging ELL's Positionality Through Critical Geography and History in the Social Studies Classroom", "Developing Literacy Through Contemporary Art: Promising Practices for English Language Learners in Social Studies Classrooms ", "Visual Biography and Citizenship: Biography Driven Instruction in the Social Studies Classroom", "Thinking Inside the Box: Using Graphic Novels to English Language Learners in the Social Studies Classroom", and "Multiple Perspectives: Engaging Diverse Voices in the Social Studies Classroom"). The chapters provide different approaches for teaching varied academic contents to English language learners, an increasing population in today's schools. Each part provides insights on the pedagogical approaches taken by content and language educators who set out to support ELLs in a particular school subject. In addition to revealing educational content-language integrated practices prevalent in the fields of ELA education, mathematics education, science education and social studies education, each section also highlights theoretical perspectives and research findings that predominantly inform and influence efforts to teach content to ELLs in distinct content areas found in the secondary school curriculum. Combined, these four sets of chapters afford readers a unique opportunity to familiarize themselves with the current state of language across the curriculum as well as a chance to explore similarities and differences in language-content curriculum spaces. An overview of all pedagogical approaches examined in this book can be found in Table 1.

6 Transcendent Practices and Theories

Several transdisciplinary pedagogical practices cut across content areas (see Table 2 for a matrix of how strategies and theories map across the chapters). One important content-language integration practices that transcends school subjects is **visualization**, a trend that suggests that visual support and scaffolding constitutes an essential feature of content-language curriculum spaces, irrespective of content area.

Across the chapters, visual supports are extensively used to teach specialized non-language content to ELLs. These visual-based approaches to content-language instruction typically involve strategic deployment of visual supports such as diagrams and graphs (chapters "Keying English Learner Students into Mathematical Content: The *Things I Notice* Approach", "A Framework for Improving the Teaching of Mathematics to Bi/Multilingual Learners", and "Engaging English Language Learners in Model-Based Science Instruction"), maps (chapter "Engaging ELL's Positionality Through Critical Geography and History in the Social Studies Classroom"), word walls (chapter "Supporting English Language Learners Through Inquiry-Based Science: Three Strategies for Your Classroom"), visual biographies (chapter "Developing Literacy Through Contemporary Art: Promising Practices for English Language Learners in Social Studies Classrooms"), graphic novels (chapter

Table 1 Overview of chapters per disciplinary area

Chapters		Pedagogical approaches
ELA	Multimodal Literacies in the English Language Arts Classroom for English Language Learners	Multimodal literacies that integrate components of knowledge processes.
	From Words to Thematic Text Analysis: Collocation Activities as Academic Vocabulary Building Strategies in the Middle and High School ELA Classroom (Grades 6–12)	Apprenticeship approach: scaffolded instruction, student-centered tasks, collaboration and negotiation of meaning, and front-loading discussions.
	A Genre-Based Approach to Teaching Argument Writing	Genre-based teaching and learning cycle (TLC) for reading and writing: Deconstruction, Joint Construction, and Independent Construction.
	Six High-leverage Writing Practices for Teaching English Language Learners in English Language Arts	Writing practices that support the needs of ELLs: genre writing taught as a detailed, recursive practice, and modeling of metacognitive process for writing.
	Using Multicultural Nonfiction and Multimedia to Develop Intercultural Competence	Scaffolded close reading, listening, and communication activities; collaborative writing, publishing, and presenting.
Mathematics	Keying English Learner Students into Mathematical Content: The *Things I Notice* Approach	"Things I Notice" approach: Think-Pair-Share, examination of mathematical representations/objects.
	Doing and Talking Mathematics: Engaging ELLs in the Academic Discourse of the Mathematical Practices	Discourse moves (questioning, feedback) to: facilitate oral discussion, and foster collaborative meaning-making;
	A Framework for Improving the Teaching of Mathematics to Bi/Multilingual Learners	Reflective prompts: know the content, know the language, know the learner, engage the community and assess meaningfully.
	Culturally Supporting Latinas and Korean Girls in Mathematics	Culturally and linguistically sensitive practices for creating learning opportunities based on ELLs cultural backgrounds and specific needs.
	Linguistically Responsive Teaching to Foster ELL Engagement, Reasoning, and Participation in a Mathematics Discourse Community	Word problems and visual representations to teach math register: responsive practices (L1 use, translanguaging) and discourse moves (questioning prompts).

(continued)

Table 1 (continued)

Chapters		Pedagogical approaches
Science	Activating Bilingual English Language Learners' Strengths in Science: The Pedagogy of Argument Driven Inquiry (ADI)	Argument Driven Inquiry: experimental investigation combined with oral argumentation, writing, and peer review.
	Supporting English Language Learners Through Inquiry-Based Science: Three Strategies for Your Classroom	Inquiry-based strategies for ELLs: short silent movies, interactive word walls, interactive science notebooks, and collaborative learning.
	Engaging English Language Learners in Model-Based Science Instruction	Scientific modeling with language combining (sentence frames, word banks). ELLs orally defend and write explanations for scientific models.
	Scaffolding English Language Learners' Literacy Development Through a Science Inquiry Approach	Supporting ELLs through macro-scaffolding (careful sequencing of activities and lesson) and micro-scaffolding (comprehensible input).
	Using Communication Models to Teach ELLs Science	Discourse moves for teachers to facilitate oral discussion (5R model) and planning for just-in-time support during inquiry lessons.
Social studies	Engaging ELL's Positionality Through Critical Geography and History in the Social Studies Classroom	Critical geography activities: creating map of daily lives, listing significant places and spaces, creating map-based narratives, and primary source analysis.
	Developing Literacy Through Contemporary Art: Promising Practices for English Language Learners in Social Studies Classrooms	Biography-driven instruction for civic development: citizenship education and visual biography using Photovoice.
	Visual Biography and Citizenship: Biography Driven Instruction in the Social Studies Classroom	Using contemporary art to promote ELL learning of social studies and current social issues.
	Thinking Inside the Box: Using Graphic Novels to English Language Learners in the Social Studies Classroom	Graphic novels, use of multimodal text supports and historical fiction narratives to promote ELLs comprehension.
	Multiple Perspectives: Engaging Diverse Voices in the Social Studies Classroom	Developing multiple perspectives through Structured Academic Controversy (SAC) and Readers' Theater.

Table 2 Transcendent practices in content-language curriculum spaces

Transcending practices	Chapters
Visualization	"Keying English Learner Students into Mathematical Content: The *Things I Notice* Approach", "A Framework for Improving the Teaching of Mathematics to Bi/Multilingual Learners", "Supporting English Language Learners Through Inquiry-Based Science: Three Strategies for Your Classroom", "Engaging English Language Learners in Model-Based Science Instruction", "Engaging ELL's Positionality Through Critical Geography and History in the Social Studies Classroom", "Developing Literacy Through Contemporary Art: Promising Practices for English Language Learners in Social Studies Classrooms", "Visual Biography and Citizenship: Biography Driven Instruction in the Social Studies Classroom", "Thinking Inside the Box: Using Graphic Novels to English Language Learners in the Social Studies Classroom"
Writing/text production	"A Genre-Based Approach to Teaching Argument Writing", "Six High-leverage Writing Practices for Teaching English Language Learners in English Language Arts", "Using Multicultural Nonfiction and Multimedia to Develop Intercultural Competence", "Activating Bilingual English Language Learners' Strengths in Science: The Pedagogy of Argument Driven Inquiry (ADI)", "Scaffolding English Language Learners' Literacy Development Through a Science Inquiry Approach", "Engaging ELL's Positionality Through Critical Geography and History in the Social Studies Classroom", "Developing Literacy Through Contemporary Art: Promising Practices for English Language Learners in Social Studies Classrooms"
Oral discussion	"From Words to Thematic Text Analysis: Collocation Activities as Academic Vocabulary Building Strategies in the Middle and High School ELA Classroom (Grades 6–12)", "Doing and Talking Mathematics: Engaging ELLs in the Academic Discourse of the Mathematical Practices", "Linguistically Responsive Teaching to Foster ELL Engagement, Reasoning, and Participation in a Mathematics Discourse Community", "Using Communication Models to Teach ELLs Science"
Kinesthetic activity	"Activating Bilingual English Language Learners' Strengths in Science: The Pedagogy of Argument Driven Inquiry (ADI)", "Supporting English Language Learners Through Inquiry-Based Science: Three Strategies for Your Classroom", "Engaging English Language Learners in Model-Based Science Instruction", "Multiple Perspectives: Engaging Diverse Voices in the Social Studies Classroom"

"Thinking Inside the Box: Using Graphic Novels to English Language Learners in the Social Studies Classroom"), and art viewing guides (chapter "Visual Biography and Citizenship: Biography Driven Instruction in the Social Studies Classroom"). Commonly found in various parts of the content classroom (walls, blackboard, textbook, instructional materials, computer screens, PowerPoint projections, etc.), such imagery can provide ELs with conceptual support as well as linguistic support. Conceptually-focused visuals promote content mastery by helping students visualize and make sense of abstract concepts and ideas important to an academic discipline (e.g., graphs). Typically found in science, mathematics and social studies, these conceptual representations share a certain degree of analogical correspon-

dence with target concepts (i.e., serve as *visual analogies*) (Gilbert & Ireton, 2003). On the other hand, language-focused visual supports depict language itself (e.g., wordwalls, Frayer Model). By making keywords accessible in the nearby physical environment (e.g., classroom walls, handouts), these visuals linguistically support ELLs. These language representations are typically used by language arts teachers to support vocabulary instruction (Fisher, & Frey, 2008; Graves, August, & Mancilla-Martinez, 2013).

Though inclusive of both paper-based and computer-based forms, more dynamic forms of visual representation such as interactive computer simulations are relatively less frequent in content-language curriculum spaces across school subjects. Unlike static visuals, dynamic visuals such as computer animations and videos provide ELLs with transient (vs. permanent) information (Höffler & Leutner, 2007; Lowe & Schnotz, 2008). The potential pedagogical affordances of non-static visuals for language-content curriculum spaces are exploited in only isolated instances, hence suggesting that non-static visuals are yet to become an integral part of efforts aimed promoting language across the curriculum.

Another transcendent and transdisciplinary practice in content-language integration is the use of **writing**. Across school subjects, writing-to-learn strategies are widely adopted in support of ELL content development. As part of these literacy-based approaches to content-language integrated instruction, ELLs generally receive explicit instruction on wide range of academic genres and literary practices (chapters "A Genre-Based Approach to Teaching Argument Writing", "Six High-leverage Writing Practices for Teaching English Language Learners in English Language Arts", and "Using Multicultural Nonfiction and Multimedia to Develop Intercultural Competence") and produce remarkably distinct texts depending on the specific disciplinary context in which written production occurs, including science inquiry reports (chapters "Activating Bilingual English Language Learners' Strengths in Science: The Pedagogy of Argument Driven Inquiry (ADI)" and "Scaffolding English Language Learners' Literacy Development Through a Science Inquiry Approach"), self-narratives (chapter "Engaging ELL's Positionality Through Critical Geography and History in the Social Studies Classroom"), and biographies (chapter "Developing Literacy Through Contemporary Art: Promising Practices for English Language Learners in Social Studies Classrooms"). Such a trend underscores the important role that writing can play in supporting ELLs' simultaneous acquisition of language and content. For this to occur, writing needs to be situated as part of a larger context of guided reflection and exploration.

Transcendent use of writing is consistent with recent calls for writing within the disciplines, based on the differing forms of argument and evidence central to each discipline (Applebee & Langer, 2011a, 2011b; Langer, 2011). From this perspective, teaching disciplinary writing falls centrally within the domain of the subject matter teacher. As emphasized by Shanahan and Shanahan (2008) "there are differences in how the disciplines create, disseminate, and evaluate knowledge, and these differences are instantiated in their use of language" (p. 48). Rather than simply completing assignments that are limited in scope and highly formulaic (regurgitating information within templates and worksheets), students need to engage in kinds

of writing that allow them to explore new understandings, articulate ideas, activate prior knowledge, clarify evolving interpretations of concepts, and reflect on what has been learned that is at the heart of classroom activity. This is precisely the type of writing emphasized by disciplinary educators who embrace written text production in support of ELLs in various chapters of this book.

A third transcendent practice in content-language integration across the curriculum is **oral discussion**. Across all four content areas, secondary subject matter educators consistently resort to scaffolded spoken discourse (teacher-led and small-group discussions) as a means to meet language learners' linguistic and epistemic needs. To simultaneously support ELL content knowledge and language development, educators in ELA, math, science, and social studies have developed specific questioning techniques and discursive moves (chapters "Doing and Talking Mathematics: Engaging ELLs in the Academic Discourse of the Mathematical Practices", "Linguistically Responsive Teaching to Foster ELL Engagement, Reasoning, and Participation in a Mathematics Discourse Community" and "Using Communication Models to Teach ELLs Science") as well as practices such as front-loading discussions (chapter "From Words to Thematic Text Analysis: Collocation Activities as Academic Vocabulary Building Strategies in the Middle and High School ELA Classroom (Grades 6–12)"). Such a pattern is clearly indicative of growing awareness among content educators of the importance of engaging ELLs in meaningful instructional conversations and dialogical meaning-making.

This transcendence of orality in content-language curriculum spaces is consistent with general endorsement of dialogism in educational scholarship. Growing numbers of content educators have advocated use of spoken strategies designed specifically to support meaning-making and to open up classroom dialogue (Reichen, Oliveira, Oliver, & Florencio-Wain, 2016). Rooted in Bakhtin's (1981) and Voloshinov's (1995) seminal work, dialogical approaches typically entail a shift away from traditional interactional patterns such as monologues (lectures) and Initiation-Response-Evaluation (or IRE) (Lemke, 1990; Mehan, 1979) to classroom discussions that resemble casual conversations and are characterized by plurality of voices, interactivity (turn-taking), transactivity (uptake and elaboration of each other's ideas), social equality, spontaneity (emergent and unplanned topic development), informal and supportive relationships) and non-authoritative negotiation of meanings. As previous research has shown, classroom discussions can be characterized by "pseudo-dialogism" in the sense that students remain without a voice even when allowed to speak. In truly dialogic exchanges, ELLs claim ownership, agency, and responsibility for words spoken, and their utterances are recognized as epistemically valuable (serious and important contributions to knowledge construction process), being taken up into the larger conversation. This what it means for ELLs to truly have a voice in content classrooms.

A fourth and final content-language integrated practice that crosses disciplinary boundaries is **kinaesthetic activity**. In several chapters, content educators resort to "learning by physically doing" as means to support ELLs. This physical activity can take a wide range of forms spanning from physical manipulation of tangible objects as part of science inquiries (chapters "Activating Bilingual English Language

Learners' Strengths in Science: The Pedagogy of Argument Driven Inquiry (ADI)", "Supporting English Language Learners Through Inquiry-Based Science: Three Strategies for Your Classroom", and "Engaging English Language Learners in Model-Based Science Instruction") to theatrical performance and role playing (chapter "Multiple Perspectives: Engaging Diverse Voices in the Social Studies Classroom"). Such a trend suggests growing realization among educators that thoughtful integration of doing (physical activity) with speech (verbal activity) can provide ELLs with a more authentic context for purposeful language use and knowledge co-construction.

Engagement in hands-on activity is particularly common in science education wherein students physically perform physical actions as part of investigative efforts such as science inquiries. Aimed at producing empirical evidence to answer scientific questions, students "talk science" as they plan and implement science experiments such as fair tests. Far less common is the deployment of dramatism and theatricality as a pedagogical resource that can be strategically drawn upon in support of student acquisition of scientific content. Although the pedagogical value of drama activities has been previously highlighted in studies showing that complex and abstract concepts such as chemical formulas (Aubusson & Fogwill, 2006), ecosystems (Bailey & Watson, 1998), states of matter (Varelas et al., 2010), and wavelengths (Dorion, 2009) can afford students deeper scientific understandings, theatrical activity remains fairly rare. The same state of affairs pervades content-language integrated approaches described in this book wherein investigative action is for the most part favored over theatrical action. The performing arts seem to remain for the most part absent from content-language curriculum spaces as currently approached by non-language educators.

In conclusion, the chapters in this book illuminate the multifaceted nature of designing and realizing curriculum spaces at the intersection of content and language. Together, they paint a picture of effective content-language integration across the curriculum as a pedagogical endeavor that is highly generative, dialogic, dynamic, figurative, formative, and transformative. They also highlight the fact that language is paramount to the enculturation of learners into academic thought, regardless of specific discipline. As Oliver Wendell Holmes poetically argues, "language is the blood of the soul into which thoughts run and out of which they grow." It is our hope that the present book can help educators not only recognize but also capitalize on this organic/symbiotic/physiological relationship, and thus make subject area instruction more inclusive, equitable and accessible to all students regardless of language or sociocultural background.

7 Overview of Chapters

Chapters "Multimodal Literacies In The English Language Arts Classroom For English Language Learners", "From Words to Thematic Text Analysis: Collocation Activities as Academic Vocabulary Building Strategies in the Middle and High

School ELA Classroom", "A Genre-Based Approach to Teaching Argument Writing", "Six High-Leverage Writing Practices for Teaching English Language Learners in English Language Arts" and "Using Multicultural Nonfiction and Multimedia to Develop Intercultural Competence" provide approaches focused on multiliteracies, vocabulary development, writing instruction, and multimedia-integrated literacy activities in the content area of English language arts. Chapter "Multimodal Literacies In The English Language Arts Classroom For English Language Learners" by Luciana C. de Oliveira, Loren Jones, and Sharon Smith, explores an approach to teaching ELA to English language learners through a multimodal literacies framework with an emphasis on multimodality. They focus on four components of multiliteracies, and how the focal ELA teacher uses these to guide her instruction and discuss the specific ways in which an ELA high school teacher implemented these components in her 9th grade classroom through a multimodal project focused on the Holocaust. They conclude with implications for practicing and pre-service teachers and educational researchers.

In chapter "From Words to Thematic Text Analysis: Collocation Activities as Academic Vocabulary Building Strategies in the Middle and High School ELA Classroom," Brandy Gibb and Guofang Li describe how ELA teachers can provide apprenticeship in academic vocabulary through collocation (or common phrasing) activities to help ELLs develop their use of sophisticated content-based vocabulary and prepare them for thematic text analysis tasks in the ELA classroom. They highlight how working with collocations requires ELLs to combine academic vocabulary into phrasal categories such as combining the academic word, often a noun, with the appropriate verb, adjective, or preposition. They highlight how this process leads to a thematic understanding of the academic language used throughout a text and is a transferable skill that supports ELLs' academic success within and beyond the ELA classroom.

Chapter "A Genre-Based Approach to Teaching Argument Writing," by Kathleen Ramos, provides an authentic classroom example of a research-based approach that secondary ESOL/ELA teachers can apply to teach ELLs from diverse cultural, linguistic, and educational backgrounds to write an academic-style, authoritative argument. Using the teaching and learning cycle (TLC) of genre pedagogy, teachers can make visible and tangible the language tools, or academic language resources, that ELLs can employ to write well in this critical genre. This chapter is grounded in theories of language and learning and provides advice for teachers to use the TLC to design and implement instruction that strengthens ELLs' academic language and literacy development while supporting learning of grade-level disciplinary content.

In chapter "Six High-Leverage Writing Practices for Teaching English Language Learners in English Language Arts," Julie Goldman gives an overview of the Six High-leverage Writing Practices Approach for teaching ELLs in ELA contexts. The chapter aims to help educators cultivate a shared understanding around quality ELL-relevant instructional practices and create more purposeful, coherent systems – in classrooms and across schools – to support ELLs to thrive academically. This approach links theory to practice and provides a structure for teachers to

engage culturally and linguistically diverse students in a dynamic culture of thinking and meaning making.

Chapter "Using Multicultural Nonfiction and Multimedia to Develop Intercultural Competence," by Vicky Giouroukakis and Maureen Connolly, describes an approach used in the ELA classroom that combines multicultural nonfiction and multimedia to develop students' intercultural competence. This approach encompasses an extended learning experience involving In Our Village, a series of nonfiction texts about different cultures throughout the world. The chapter provides examples of various literacy activities and multimedia use to explore the concept of culture and represent students' new understandings and experiences through the publication of their own book about their cultures.

Chapters "Keying English Learner Students into Mathematical Content: The *Things I Notice* Approach", "Doing and Talking Mathematics: Engaging ELLs in the Academic Discourse of the Mathematical Practices", "A Framework for Improving the Teaching of Mathematics to Bi/Multilingual Learners", "Culturally Supporting Latinas and Korean Girls in Mathematics" and "Linguistically Responsive Teaching to Foster ELL Engagement, Reasoning, and Participation in a Mathematics Discourse Community" discuss approaches to the teaching and learning of mathematics through discourse-based, culturally-sensitive, and linguistically-responsive strategies. Chapter "Keying English Learner Students into Mathematical Content: The *Things I Notice* Approach," by Jill A. Perry and Beth A. Wassell, describes *Things I Notice,* a three-phase approach to teaching mathematics in which teachers engage students in deliberately examining and interrogating features of mathematical representations or problem structures by providing independent noticing/thinking time, partner discussion time, and whole-class discussion time. Using a vignette of a high school teacher who uses this approach with a group of ELLs with varied proficiency levels in English, the authors explain how this approach can be enacted in a classroom to help ELLs engage as members of a community of mathematical discourse while supporting their oral academic language development.

In chapter "Doing and Talking Mathematics: Engaging ELLs in the Academic Discourse of the Mathematical Practices," Rita MacDonald, Sarah Lord, and Emily Miller present a process and resources for enacting a discourse-centered pedagogy that builds mathematical understanding while simultaneously engaging and supporting students to develop the language of complex thinking. Using a small set of Teacher Discourse Moves and Student Discourse Moves, teachers focus on deepening students' mathematical reasoning in ways fully inclusive of ELLs, while also helping all students build the language of complex thinking and mathematical argumentation.

In chapter "A Framework for Improving the Teaching of Mathematics to Bi/Multilingual Learners," Kara Mitchell Viesca, Nicole M. Joseph, and Nancy Commins propose that mathematics teachers should consider the following five elements to teach mathematics to bi/multilingual learners: know the content, know the language, know the learner, engage the community and assess meaningfully. This chapter defines each of these elements, explores how they are put into practice, and

shares the responses of teachers who have participated in online professional development organized around each element. The authors claim that approaching mathematics teaching with these elements in mind enables teachers to more effectively support high levels of learning and achievement for bi/multilingual learners across levels of English proficiency and grade levels.

Chapter "Culturally Supporting Latinas and Korean Girls in Mathematics," by Woong Lim, Kyeong-Hwa Lee, and Paula Guerra, discusses strategies to create culturally and linguistically sensitive secondary mathematics classrooms. The authors use a teaching scenario of a review activity to solve Algebra 2 problems to illustrate four practices for promoting ELLs' thinking, reasoning, and participation in classroom discourse. The chapter shows how teachers can create a safe, interactive learning environment for ELLs through cultural sensitivity and a positive relationship with learners, their families and communities.

In chapter "Linguistically Responsive Teaching to Foster ELL Engagement, Reasoning, and Participation in a Mathematics Discourse Community," Mary A. Avalos and Walter G. Secada draw upon a co-teaching experience in a sixth-grade mathematics classroom as to how mathematics teachers can carry out research-based suggestions to foster ELLs' engagement and participation in mathematics discussions; to apprentice use of the mathematics register; and ultimately, to develop content understanding. They illustrate this approach based on actual experiences to establish an environment conducive to discussions in an urban classroom, with the objective of utilizing semiotics, such as language, symbols, and visual representations during instruction as relevant mathematical meaning-making systems.

Chapters "Activating Bilingual English Language Learners' Strengths in Science: The Pedagogy of Argument Driven Inquiry (ADI)", "Supporting English Language Learners Through Inquiry-Based Science: Three Strategies for Your Classroom", "Engaging English Language Learners in Model-Based Science Instruction", "Scaffolding English Language Learners' Literacy Development Through a Science Inquiry Approach" and "Using Communication Models to Teach ELLs Science" take readers through approaches focusing on language-intensive instructional strategies, inquiry-based methods, hands-on activities, and interdisciplinary lessons in the content area of science. Chapter "Activating Bilingual English Language Learners' Strengths in Science: The Pedagogy of Argument Driven Inquiry (ADI)," by Rebecca M. Callahan, Victor Sampson, and Stephanie Rivale, describes how teachers can use the Argument Driven Inquiry (ADI) instructional approach to provide bilingual ELLs with opportunities to participate in the practices of science while strengthening both their English and scientific literacy skills. This type of language-intensive instructional approach can also help bilingual ELL students develop and maintain science identities.

In chapter "Supporting English Language Learners Through Inquiry-Based Science: Three Strategies for Your Classroom," Joshua W. Reid, Cindi Smith-Walters, Katherine A. Mangione, Alison Dorris, and Terri Tharp use inquiry-based learning as an approach to discuss three strategies for teaching ELLs science content: (a) short silent movies, (b) interactive word walls, and (c) interactive science

notebooks. Using vignettes that focus on natural selection to give context for each strategy, the authors discuss the best methods to implement these strategies, suggestions to modify them, as well as the limitations of each. The chapter concludes with a summary of each strategy, a brief discussion on how to combine these strategies for maximum benefit, as well as, questions to reflect on how to promote best practices with these strategies.

Chapter "Engaging English Language Learners in Model-Based Science Instruction," by Magdalena Pando and Zenaida Aguirre-Muñoz, discuss a model-based instructional approach that integrates content and language to provide ELLs with linguistically rich opportunities while learning science. This approach allows ELLs opportunities to construct models as hands-on activities to represent some aspect of reality and to practice using the language of science to evaluate and defend their model constructions through oral and written argumentation.

In chapter "Scaffolding English Language Learners' Literacy Development Through a Science Inquiry Approach," Sandra Mercuri and Natascha Mercuri present an interdisciplinary Life Sciences inquiry unit centered in a constructivist view of learning through macro and micro scaffolding. They draw on disciplinary literacy and discipline-specific academic language lenses to discuss how the interrelated activities are aligned with national standards and show how the language and literacy practices are embedded throughout the science unit. The chapter provides examples of how teachers could help ELLs learn content and to read and write more, to use grammar and vocabulary more accurately, and to master an extensive range of linguistic features in order to meet the standards challenging academic demands.

Chapter "Using Communication Models to Teach ELLs Science," by Alandeom Oliveira and Molly Weinburgh describe how science teachers can use communication models to guide their design and implementation of science lessons for ELLs. Taking the form of diagrams that visually depict communicative processes underlying science content instruction, communication models provide instructors with an intuitive and accessible way of critically examining content-language integrated learning. The authors show how two models – repair-and-accommodation and 5R – help science teachers with limited linguistic expertise infuse content learning with additional language acquisition.

Chapters "Engaging ELL's Positionality Through Critical Geography and History in the Social Studies Classroom", "Developing Literacy Through Contemporary Art: Promising Practices for English Language Learners in Social Studies Classrooms", "Visual Biography and Citizenship: Biography Driven Instruction in the Social Studies Classroom", "Thinking Inside the Box: Using Graphic Novels to English Language Learners in the Social Studies Classroom" and "Multiple Perspectives: Engaging Diverse Voices in the Social Studies Classroom" describe approaches to teaching social studies through critical geography and history, contemporary art, visual biography and citizenship, and an exploration of multiple perspectives. Chapter "Engaging ELL's Positionality Through Critical Geography and History in the Social Studies Classroom," by J. Spencer Clark, G. Sue Kasun, and Fallon Farokhi describes an approach to engage ELLs' position-

ality through a carefully sequenced critical geography activity that asks students to create a map of their daily life, list significant places and spaces, and identify their relationships to these places and spaces. Students develop a narrative related to their map and use both as primary sources to compare, contrast, and/or corroborate with their classmates and discuss the role of positionality in interpreting historical and current circumstances.

In chapter "Developing Literacy Through Contemporary Art: Promising Practices for English Language Learners in Social Studies Classrooms," Bárbara C. Cruz and Robert W. Bailey describe an innovative approach that incorporates contemporary art in social studies instruction. A model lesson is included that explores the work of contemporary artist Mary Mattingly and has students consider the ecological footprints left by humans as they interact with their environment. A university-school partnership that employs curricular interdisciplinarity, relevance to students' lives, and active learning is described. To achieve these goals, ELL-supportive classroom strategies such as rich visual content, word walls, and scaffolded cooperative learning are utilized and discussed.

Chapter "Visual Biography and Citizenship: Biography Driven Instruction in the Social Studies Classroom," by Jillian Baldwin Kim, Alexander Cuenca, and Amy Yun-Ping Chen, describes an approach that cultivates ELLs' social, civic, and cultural fluency to surface their contextualized civic realities. The authors suggest a biography-driven instructional approach as an opportunity to learn about students' civic lives and share how the construction of a visual biography through photography can be used to personalize the rights, responsibilities, and spaces of citizenship.

In chapter "Thinking Inside the Box: Using Graphic Novels to English Language Learners in the Social Studies Classroom," Carla K. Meyer, Laura Mahalingappa, and Kristy A. Brugar detail how to use a sheltered model that incorporates an explicit focus on disciplinary language needs and development to teach ELLs history while investigating the role graphic novels and reflective inquiry play in their instruction.

Chapter "Multiple Perspectives: Engaging Diverse Voices in the Social Studies Classroom," by Paul J. Yoder and Ashley Taylor Jaffee, explores the investigation of multiple perspectives and showcases two pedagogical strategies – Structured Academic Controversy and Reader's Theater – that teachers can use to make content accessible and highlight students' diverse voices. They draw on a framework for multicultural education, present each pedagogical strategy, and discuss how these strategies support a social studies curriculum that is culturally and linguistically responsive to the needs of ELLs.

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Part I
English Language Arts

Multimodal Literacies in the English Language Arts Classroom for English Language Learners

Luciana C. de Oliveira, Loren Jones, and Sharon L. Smith

Abstract This chapter discusses an approach to teaching English language arts (ELA) to English language learners through a multimodal literacies framework with an emphasis on multimodality. We focus specifically on four components of multiliteracies, and how the focal ELA teacher uses these to guide her instruction. We discuss the specific ways in which an ELA high school teacher implemented these components in her 9th-grade classroom through a multimodal project focused on the Holocaust. We conclude with implications for practicing and pre-service teachers and educational researchers.

1 Introduction

The English language arts (ELA) classroom has changed over the last few years to incorporate more than reading and writing practices. The concept of what it means to be literate has drastically changed over the last few decades. Since literacy is a compilation of societal and communicative practices, it is only presumed that literacy will change and be reconceptualized as technology develops and cultures evolve (National Council of Teachers of English [NCTE], 2013). In ELA and beyond, more than ever before, students are encountering daily a wide variety of texts in which images and other design features are central (Jewitt, 2009; Serafini, 2015). A literate student in the twenty-first century must be proficient in many dynamic multimodal literacies (NCTE, 2013).

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A *multimodal text* is a digital or print-based text that uses two or more modes, or semiotic resources, to represent and communicate meaning within a social context (Jewitt, 2009; Kress, 2010; Serafini, 2014). Each mode is a unique resource for meaning-making and adds layers to the text's intricacy (Kress & van Leeuwen, 2006; Serafini, 2015). *Multimodal literacies*, therefore, are a way of developing meaning from multimodal texts within a broader sociocultural context (Serafini, 2014). Multimodal literacies focus on the communicative opportunities that each semiotic resource contains, how those meanings interact with each other, and how they interact with the viewer or reader (Serafini, 2015; Unsworth, 2006).

Since multimodal literacies provide students with unique meaning-making opportunities, they can be a particularly useful and engaging tool for English language learners (ELLs; Hafner, 2014; Pacheco & Smith, 2015; Smith, 2013). They allow ELLs multiple points of access into the content when students are viewers and readers. Analyzing and creating multimodal texts also allows ELLs of all levels to express themselves in unique ways through leveraging multiple semiotic resources to create multidimensional meanings (Pacheco & Smith, 2015). Through projects with multimodal components, students are able to express themselves more than they would be able to with unimodal written texts (Zapata, 2014).

In this chapter, we discuss our approach to teaching ELA to ELLs through a multimodal literacies framework with an emphasis on multimodality. We focus specifically on four components of multiliteracies and their correspondent knowledge processes, described below, and how the focal ELA teacher uses these to guide her instruction. We discuss the specific ways in which Helen, an ELA high school teacher, implemented these components in her 9th grade classroom through a multimodal project focused on the Holocaust. We conclude with implications for practicing and pre-service teachers and educational researchers.

2 Approach to Teaching English Language Arts to ELLs: Multimodal Literacies

A multimodal literacies approach aims to design innovative learning environments that lead to full and equitable social participation for all students in a range of multiliteracies practices (Ajayi, 2011; Bull & Anstey, 2007; Cope & Kalantzis, 2015; New London Group, 1996). We draw on a pedagogy of multiliteracies (e.g. Rowsell, Kosnik, & Beck, 2008) to describe our specific approach. We chose to name it *multimodal literacies* to more closely align with the NCTE position statement (NCTE, 2005). Teachers can implement these varied multimodal literacy practices when teaching ELLs by using a pedagogical design composed of a complex integration of four components: (a) situated practice, (b) overt instruction, (c) critical framing, and (d) transformed practice (New London Group, 1996).

The first component is *situated practice/experiencing,* in which teachers create opportunities for students to engage in valuable educational experiences within a

community of learners. The second factor is *overt instruction/conceptualizing,* which states that the teacher and other experts in the classroom should provide valuable scaffolding that allow the learners to gain explicit information helping to build on what they already know and have accomplished. The third factor is *critical framing/analyzing,* in which the goal is to help learners frame their growing knowledge in relation to the historical, social, cultural, political, ideological, and value-centered contexts. The fourth and final factor is *transformed practice/applying,* in which teachers create opportunities for students to creatively extend and apply their new knowledge and forms of expression relative to their own goals and values (Cope & Kalantzis, 2015).

These four components were reframed and reconceptualized as 'knowledge processes': (a) experiencing, (b) conceptualizing, (c) analyzing, and (d) applying (Kalantzis & Cope, 2010). These are not hierarchical; rather, they are related in dynamic, complex ways. These components are correlated with the knowledge processes and can occur synchronously or asynchronously, with one element dominating at different times (Kalantzis & Cope, 2010).

3 Theoretical Foundations of the Approach

This chapter draws on the theoretical premises of a multiliteracies pedagogy that broadens the idea of literacy and ELA instruction to include all semiotic resources and the sociocultural contexts in which they are created and interpreted (Cope & Kalantzis, 2015). The two central underpinnings of this pedagogy are an acknowledgement of (a) the multiplicity of communicative modes for making meaning, especially the tools associated with information technologies and multimedia, and (b) the ever growing culturally and linguistically diverse communities that result from our globalized society (Danzak, 2011).

Students in today's ELA classrooms are exposed to a wide variety of meaning-making modes on a daily basis, including linguistic, visual, audio, gestural, and spatial meanings. In addition, many of these modes are combined to create multimodal meanings (Kalantzis, Cope, Chan, & Dalley-Trim, 2016). For example, students are constantly on devices where they see page layouts with written text and images, often while hearing music and other sound effects. They see billboards with phrases and pictures, attend concerts and shows with music, body language, and images flashing on background screens, or participate in interactive conversations using a wide variety of semiotic resources, including body language, tone, and linguistics. Since students are living in this reality in the twenty-first century, teachers are tasked with incorporating multiple modes in their instruction in order to provide authentic learning experiences that engage students and prepare them for the nuanced meanings that they will encounter in all aspects of their lives.

Equally important in this pedagogy is the second premise, which recognizes that individuals, communities, and schools are now connected at the global level (Danzak, 2011). At the same time, these communities and schools have become

more linguistically and culturally diverse. As a result, teachers must be prepared to provide effective, inclusive instruction that provides all students with equitable opportunities for social and academic success.

A multimodal literacy pedagogy gives teachers the resources to recognize the value and capitalize on students' cultural and linguistic resources through instruction that incorporates multiple meaning-making modes, apart from traditional unimodal forms of reading and writing (Ajayi, 2009; Hull & Nelson, 2005). This pedagogical approach has shown to be especially effective for ELLs. Various studies working with culturally and linguistically diverse students across all grades and content areas have also shown how multimodal ELA projects encourage students to draw from their multiple linguistic repertoires and meaning-making resources. These multimodal projects supported students' literacy learning and identity development (Ajayi, 2009; Danzak, 2011; Ntelioglou, Fannin, Montanera, & Cummins, 2014; Skinner & Hagood, 2008; Taylor, Bernhard, Garg, & Cummins, 2008). This pedagogy gives students the potential to access and experience content in new ways, which also allows them to produce new situated meanings reflective of their own sociocultural backgrounds (Ajayi, 2009; Angay-Crowder, Choi, & Yi, 2013; Danzak, 2011). Because this approach is situated in authentic literacy activities, students feel connected to the real world. In addition, they are motivated because their identities are recognized and valued.

4 Implementation of the Approach

In this section, we provide of an overview of what the multimodal literacies approach in support of ELLs looks like in an ELA classroom. We use examples of specific activities that drew on this approach during a Holocaust unit. The diverse, 9th-grade class was taught by Helen (pseudonym), a secondary ELA teacher.

4.1 Project: Multimodal Interpretation of the Holocaust

Helen designed a unit that integrated different elements of the multimodal literacies approach in support of her ELLs and her other culturally and linguistically diverse (CLD) students. First, students completed a research paper on the Holocaust. This research paper primarily focused on written text, incorporating reading and writing. To continue this focus on the Holocaust, Helen introduced the second part of the project that went beyond reading and writing to focus on visual art. Students were encouraged to use the medium of their choice (i.e. paints, clay, three-dimensional [3D] models) to represent their "artistic interpretation of the Holocaust." To begin the project, Helen displayed examples of artwork on a PowerPoint presentation. She purposefully selected examples of artwork that each had their own unique style to encourage students to be creative and think outside of the box, as they would soon

be responsible for creating their own artwork. She facilitated a group discussion to explore the visual grammar (Kress & van Leeuwen, 2006) of the different pieces of art, asking students about the symbolism, use of color, shapes, and lines and how it all worked together to convey a specific message.

Research papers are a common theme across just about all ELA curricula. While these written texts are an important component of ELA, we chose to focus on the visual component of this multimodal unit, as it is less utilized. We hope to demonstrate how teachers can incorporate a variety of different modes for more effective instruction, especially for ELLs. Below is an description of the activities related to the visual component. Students analyzed and discussed three pieces of artwork, first as a whole class and later individually. After looking at diverse examples of how to portray the Holocaust, students then had the opportunity to create their own multimodal element to complement their research paper.

To help "break the ice" for the discussion, Helen showed a picture of a specific piece of art and explained that in her interpretation it showed "a man disappearing into the wall, which represents how the Nazis wanted the Jews to disappear during the Holocaust." To open up the discussion for students' comments and interpretations, she asked, "What do the colors mean to you?" A student responded, "The colors are happy." Helen praised this response and then explained that this particular piece of art was ironic because "the colors are happy, but the ideas are not because of what is going on." As the discussion continued, a female ELL student explained that she thought it was showing both sides of the argument. She elaborated on this interpretation, justifying that the Germans were happy, but the Jews were not. Helen took the opportunity to help shape her contribution, further explaining that ultimately the German side was not happy, but that the student was on the right track. Another female student took the opportunity to offer her own explanation stating, "The author is trying to push through and become hopeful."

The next piece of art was a more abstract piece of stained glass. Immediately the students volunteered that they saw the Star of David. Then Helen asked students to think a bit more about what else they saw in the piece of art. A few of the students began to notice the forms in the background that appeared to be starving bodies. A student pointed out, "It looks like a dove coming out of the star." The class was amazed by the comment, as they hadn't noticed it before this student brought it to their attention. Helen then took the discussion a bit further by asking, "What does the art represent?" A female student answered, "It shows hope." Helen probed a bit further and asked, "What does the hole in the center mean?" The same female student took a minute to think about the additional question and answered, "It looks like a black hole."

Helen then moved on to the next piece of art. Because students had already practiced with two other pieces, and she had scaffolded their discussion, Helen asked them to remain silent and study the third painting. She encouraged them to write down their thoughts or questions about the piece and to prepare to share out with the class. The first question she asked was very general, "What is it?" A male student explained, "It looks like people's hands reaching out of a cage struggling to get out." Another student added to this explanation by describing how finger tips turn white

when hands don't get circulation for an extended period of time, and to her, that is what the painting represented.

As the conversation continued, a male student claimed that it looked like there were flames in the background. In response, a peer chimed in, "It looks like a living hell." Helen took this opportunity to discuss the artist's color selection (shades of red, orange, and black), asking students if colors played a role in their interpretation of "a living hell." They agreed, without hesitation. She wrapped up the discussion about this specific piece of art by stating that it was the most outwardly symbolic out of all the pieces of art that they had reviewed and analyzed together. These diverse responses and interpretations of the different images show how an approach such as this allows for numerous perspectives and for students to engage in multiple meaning-making opportunities.

As the PowerPoint came to an end, Helen asked students to begin working individually, or in pairs, to brainstorm ideas for the second part of their Holocaust project, "an artistic interpretation of the Holocaust." Helen gave them a unique example of a multimodal project in an effort to encourage them to use a variety of materials, apart from the more traditional art media (e.g., paint, colored pencils, or markers). She pulled up a picture of her middle school, and explained how students, staff, and community members collected 12 million pop tabs to better visualize the number of people that had died in the Holocaust. Students worked over the next few days, some collaboratively and others individually, to complete this part of their unit. It was interesting to note that while some students selected to use the more traditional art media, several students used molding clay and other materials to create 3D representations of the Holocaust in order to add a multimodal component to their previously completed research paper. These multimodal pieces gave students the freedom to express themselves and their personal understandings of the Holocaust. This proved to be especially important for ELLs, who struggled with the written component, but excelled when working multimodally.

Situated Practice/Experiencing Students in Helen's classroom community were informally bound by what they did together and what they have learned through their mutual engagement in these activities (Lave & Wenger, 1991). Multimodal literacies often require a lot of collaboration and teamwork because of their complexity (NCTE, 2005). To be effective, the classroom community must be designed as an environment in which all learners, no matter their backgrounds and experiences, are secure in taking risks and trusting the guidance of others, namely that of their peers and teachers (Cope & Kalantzis, 2015). Cooperative learning promotes intrinsic motivation, generates higher order thinking skills, improves attitudes, increases time on task, and helps to build meaningful relationships in the classroom (Aminloo, 2013). Situated practice is critical to ELLs' success in the classroom as they are given opportunities to participate in an inclusive learning environment in which their funds of knowledge (González, Moll, & Amanti, 2005) are valued. The class discussion and the students' projects show how all students, especially ELLs, can benefit from a multimodal literacies approach in the ELA classroom. The exchanges exemplify the *situated practice* element as students engaged in

discussion within a community of learners, often learning things from each other and the teacher.

Overt Instruction/Conceptualizing Among the multiple types of scaffolding found in Helen's classroom that provided learners with overt instruction, one of the most prevalent was the *expert/novice relationship*. This particular type of scaffolding can be understood as a student receiving assistance from an expert, often in the form of guidance, advice and modeling (van Lier, 1996). A second type of scaffolding, known as *collective scaffolding*, focuses on a relationship of equal knowledge. Oftentimes, learners work collaboratively to guide one another through complex problem solving (Donato, 1994; Fernández, Wegerif, Mercer, & Rojas-Drummond, 2001). Research has shown that in collective scaffolding, students create zones of proximal development (Vygotsky, 1978) for each other, which allows them to accomplish things together that they would have been unable to accomplish on their own (Walqui, 2006). Overt instruction through scaffolding is crucial for ELLs. These students are tasked with simultaneously learning a new language and new content in an unfamiliar language. In order for them to be successful, additional support and scaffolding is usually required (Hammond & Gibbons, 2005). Helen provided *overt instruction* as she scaffolded the talk about visuals, asking students to provide more details in their explanations and encouraging them to express their thoughts about each example of art.

Critical Framing/Analyzing Literacy practices are never neutral, and it is important for students to learn how to recognize which perspectives and interests are represented in the ELA classroom (Kucer, 2008; Silvers, Shorey, & Crafton, 2010; Vasquez, 2010). Through critical framing, Helen's students had the opportunity to reexamine what they had learned using a variety of lenses (Olthouse, 2013). These lenses encouraged students to take a more inclusive approach in which they looked at not only the cognitive dimensions of literacy, but also took into consideration the social and cultural contexts in which it occurs (Angay-Crowder et al., 2013; NCTE, 2013). By drawing on the cognitive and sociocultural dimensions, students learn to thoughtfully assess their world, critique their own assumptions and beliefs, and take on a new perspective (Leland & Harste, 2000; Silvers et al., 2010). Although this can be a challenging practice, it is essential in today's global society, which encompasses culturally and linguistically diverse populations. For ELLs, in particular, critical framing helps them better understand the context in which they live. It also gives ELLs a voice which they might not otherwise have, as diverse perspectives are not only tolerated, but also encouraged. Once Helen's students became comfortable with the group discussion, she utilized *critical framing* to help learners examine their new literacies in relation to various historical, social, cultural, political, ideological, and value-centered relations. More specifically, Helen displayed a piece of art and asked students to take several minutes to examine the artwork, write down their thoughts or questions about the piece, and then share out with the class. She encouraged students to think about the artwork in the context of the Holocaust and

to take into consideration everything they learned about the social, political, and cultural environment during that time.

Transformed Practice/Applying Within transformed practice, the cultural and linguistic resources that Helen's students brought with them to the classroom from their home communities were valued. These resources, commonly referred to as students' funds of knowledge (González et al., 2005), often serve as a bridge between home and school knowledge. Students drew on what they already knew to make connections and form support for their new academic learning through transformed practice. Ultimately, this gave them a rich opportunity to represent their own views and understandings in their multimodal literacy artifacts in Helen's ELA classroom, transferring meaning-making resources between contexts (Angay-Crowder et al., 2013; Olthouse, 2013). This was especially beneficial for ELLs, as their personal knowledge and experiences were validated and utilized in a new context. The multimodal element that Helen assigned students is an example of *transformed practice,* as it created an opportunity for students to creatively extend and apply their new knowledge about the Holocaust and visual representations.

5 Conclusion

This chapter discussed an approach to teaching ELA to ELLs through a multimodal literacies framework with an emphasis on multimodality. We focused on four elements of multiliteracies and their correspondent knowledge processes, and how a focal ELA teacher, Helen, used them to guide her instruction in a 9th-grade classroom through a multimodal project focused on the Holocaust.

ELLs are constantly exposed to multimodal texts in the social world around them, and teachers must provide them with authentic learning activities that include multimodal components (Lotherington & Jenson, 2011). In order to support the development of literate ELLs in today's world, educators must expand the literacy practices that they use in the classroom to include multimodal texts (Serafini, 2015). Teachers must learn how to use and teach students how to use a wide range of modes to articulate, represent, and interpret texts (Serafini, 2014). Because of the importance of utilizing multimodal literacies with ELLs in current educational settings, we focused on an instructional approach to ELA through this lens.

Multimodal literacies provide ELLs with wonderful opportunities to read, compose, and interact with "texts" of various kinds, allowing multiple points of access into the content. In the ELA classroom, the use of traditional print-based materials should be expanded to include additional sign systems, such as art, to provide richer and more complex learning experiences. Projects with multimodal components, such as the one explained in this chapter, enable ELLs to express themselves in multiple modes. Authentic learning activities that include multimodal components support the development of multiliteracies.

ELA teachers need to be prepared to address the literacies necessary for the twenty-first century and given opportunities to engage with collaboration and communication while in teacher education programs, as these skills are necessary for them to provide students with different ways to represent knowledge and communicate that knowledge to others. By integrating these skills in teacher education, we as teacher educators can support future ELA teachers' various literacies. ELA teacher educators should engage pre-service ELA teachers with multiliteracies while they are in teacher education programs.

Reflection Questions

1. Based on the implementation section of this chapter, what are some additional ways that Helen could have incorporated multimodal literacies in her ELA classroom?
2. How could you incorporate multimodality into your existing instructional units?
3. In what ways do you think a multimodal literacies approach could benefit the ELLs in your classroom?
4. What are some other examples of multimodal literacies practices that you find particularly useful for the ELA classroom?

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From Words to Thematic Text Analysis: Collocation Activities as Academic Vocabulary Building Strategies in the Middle and High School ELA Classroom (Grades 6–12)

Brandy Gibb and Guofang Li

Abstract Academic vocabulary learning has been cited as one of the major barriers to English Language Learners' (ELLs) reading comprehension and academic success in content classrooms. In English Language Arts (ELA), academic vocabulary can be complicated for ELLs as it often inhabits abstract landscapes where references to characters or events in a text are discussed through thematic, metaphoric, and/or symbolic references. However, academic vocabulary is essential for ELLs to develop their ability to independently problem solve when reading complex texts, engage in high-level text analysis, and predict meaning across texts (Halliday MAK, Matthiessen CMIM, Halliday's introduction to functional grammar, 4th edn. Routledge, London, 2013). This chapter describes how ELA teachers can provide apprenticeship in academic vocabulary acquisition through collocation (or common phrasing) activities to help ELLs develop their use of sophisticated content-based vocabulary and prepare them for thematic text analysis tasks in the ELA classroom. Working with collocations requires ELLs to combine academic vocabulary into phrasal categories such as combining the academic word, often a noun, with the appropriate verb, adjective, or preposition (Lewis M, The lexical approach: the state of ELT and a way forward. Language Teaching Publications, London, 2002). This process leads to an intuitive understanding of how to work with more advanced syntax, particularly as it relates to the creation of multi-clause sentences used to

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construct statements of analysis and develop solid arguments. This type of thematic understanding of the academic language used throughout a text is a transferable skill that supports ELLs' academic success within and beyond the ELA classroom.

1 Introduction

Academic vocabulary learning has been cited as one of the major barriers to English Language Learners' (ELLs) reading comprehension and academic success in content classrooms. In English Language Arts (ELA), academic vocabulary can be complicated for ELLs as it often inhabits abstract landscapes where references to characters or events in a text are discussed through thematic, metaphoric, and/or symbolic references. However, academic vocabulary is essential for ELLs to develop their ability to independently problem solve when reading complex texts, engage in high-level text analysis, and predict meaning across texts (Halliday & Matthiessen, 2013). For example, both CCSS (Common Core State Standards Initiative, 2017) in the U.S. and Canadian ELA standards in the *New BC Curriculum* (British Columbia Ministry of Education, 2017) specify that students in middle and high school grades can read closely to determine central ideas or themes of a text and analyze their development, summarize the key supporting details and ideas, make inferences, and cite specific textual evidence to support conclusions drawn from a text. To engage in such high-level text analysis, ELLs need to not only comprehend thematically linked academic vocabulary in the text, but also develop the ability to talk about the vocabulary and use it effectively in the specific disciplinary context.

Many adolescent ELLs have a high social fluency, but "are yet to develop the more formal and academic English associated with subject learning literacy" (Gibbons, 2009, p. 21). Therefore, it is vitally important for teachers to apprentice ELLs through explicit instruction and discussions about how language is used within a given context. This apprenticeship approach allows students to develop their use of academic language gradually with the help of someone more expert such as an ELA teacher.

This chapter describes how ELA teachers can provide such apprenticeship through collocation (or common phrasing) activities to help ELLs develop their use of sophisticated content-based vocabulary and prepare them for thematic text analysis tasks in the ELA classroom. Working with collocations requires ELLs to combine academic vocabulary into phrasal categories such as combining the academic word, often a noun, with the appropriate verb, adjective, or preposition (Lewis, 2002). This process leads to an intuitive understanding of how to work with more advanced syntax, particularly as it relates to the creation of multi-clause sentences used to construct statements of analysis and develop solid arguments. This type of thematic understanding of the academic language used throughout a text is a transferable skill that supports ELLs' academic success within and beyond the ELA classroom.

2 Theoretical Foundations of the Approach: The Lexical Approach

The six-step collocation activity that follows is anchored by the lexical approach to language learning researched by Michael Lewis and colleagues. Their extensive research into the lexical approach to language learning emphasizes the benefits of adopting a phrasal view of language (Lewis, 2002). They note that explicitly teaching collocations (or phrasal chunks) to ELLs encourages students to engage in recursive learning as they are asked to revisit vocabulary studied previously. This revisiting of Tier 2 and 3 academic vocabulary leads ELLs towards purposeful meaning making that helps them acquire higher levels of fluency. According to Lewis (2002), this revisiting includes reviewing language previously used in their own writing, an important exercise for more advanced language learners who will be writing essays. Through this review, language learners are provided with opportunities to revisit and edit their writing and through this process they will become aware of the "defective language" in their papers (Lewis, 2002, p. 91). Learning to recognize and then edit these errors is an essential part of their learning. This type of formative, process-oriented writing exercise encourages students to make mistakes without serious consequences (Lewis, 2002).

Collocation work can play an important role in helping ELLs with meaning-making and comprehension (Lewis, 2002). By learning context-specific phrasal chunks, ELLs are able to improve the accuracy of their spoken and written academic communication without becoming bogged down by the abstract complexities of grammar, such as identifying the form and functions of grammatical occurrences. Instead, by learning collocations, ELLs are able to make meaning from phrasal chunks (e.g., a prepositional phrase, or a noun + verb combination) long before they can identify the specific grammatical occurrence by name. This focus on meaning-making over abstract grammaticalization of language builds the ELL's confidence and encourages them to explore ever more complex vocabulary (de Oliveira & Schleppegrell, 2015; Lewis, 2002).

Lewis (2000) highlights the importance of making collocation activities (oral and written) part of the regular routine of the classroom and encourages teachers to do the same activity more than once to provide ELLs with the practice needed to reinforce their language learning within meaningful contexts. According to Lewis (2000), "[repetition] means learners have more time to process the language leading to better collocational use and increasing the chance of the improved language being turned into long-term intake" (p. 90). Our six-step approach, along with the expansion activity, is an excellent example of how collocation activities used throughout a unit of study can support ELLs academic language fluency through regular revisiting of new vocabulary.

Lewis (2002) emphasises that students need to be taught how to notice collocations in the readings they complete across all of their classes, but especially in ELA. This ability to notice collocations is generally quite easy to teach students in an ELA class, as authors have a tendency to use particular words and phrasal

chunks repeatedly throughout their texts. This repeated exposure to collocations within a text, reinforced by class discussions, teacher and student generated vocabulary lists, and using the observed collocations in their own writing, helps ELLs move closer to an intuitive use of English. This process, then, leads to a better understanding of the more idiomatic and metaphoric language used to discuss literature within the ELA class.

3 Approach to Teaching ELA to ELLs: Student-Centered Collocation Activities

Collocations or common phrasings refer to words that have "a tendency to co-occur" or the probability to be combined into phrases (Halliday & Matthiessen, 2013, p. 648). This means that certain words always, or often, occur with specific verbs, nouns, adjectives, adverbs, or prepositions. For example, the word *metaphor* regularly occurs with the adjectives *striking* or *useful* (*a striking metaphor*, or *a useful metaphor*); it also frequently occurs with the prepositions *for* and *of* (*a metaphor for* the human condition, or *the metaphor of* life as a journey) (OCD, 2009, p. 520). By asking students to consider how different combinations of words function within a given academic context, collocation activities engage ELLs in in-depth discourse analysis and allow ELLs to make meaning faster using academic English across a variety of contexts, while simultaneously developing their intuitive understanding of the grammatical functions of these phrasal chunks (Lewis, 2002).

According to Halliday and Matthiessen (2013), collocation is "one of the factors on which we build our expectations of what is to come next" in reading (p. 649). Learners' familiarity with how a word is used with other words affects their ability to predict meaning within and between sentences as well as throughout an entire text. For ELLs, who often lack familiarity with these common phrasings, this process of deciphering academic language can be intimidating, and at times exhausting. In particular, high frequency words with multiple meanings (known as Tier 2 words) and subject-related content words (known as Tier 3 words) often stifle ELLs' ability to understand what they are reading. Since collocation patterns contribute "significantly to the unfolding of meaning of a text" (Halliday & Matthiessen, 2013, p. 60), as students work with collocations of these academic words, they are better able to predict the flow of meaning throughout a text.

The collocation activities that follow have been designed to support ELLs in the development of their oral and written communication skills related to the use of academic English in the ELA classroom. Collocation activities can be implemented through six steps that include (1) front-loading discussions and exercises; (2) working with content-based vocabulary and/or academic word lists that are thematically related to the text being studied; (3) finding appropriate collocations using a collocations dictionary; (4) writing statements of analysis about the text that use the new vocabulary and collocations correctly; (5) sharing, discussing, and editing these

sentences as a whole class; and (6) effectively using these pre-written sentences with content-specific vocabulary and collocations during end of cycle assessments.

First, each lesson should begin with discussions in the form of explicit conversations about the academic language learning goal(s) for that class in order to ensure students have a clear understanding of the language skills that will be explored throughout the lesson. This daily practice asks students to reflect on past lessons including how previous skills learned can help guide them through the current lesson. During these discussions, it is also important for students to reflect on their personal academic language learning goal(s) and consider how these personal goals relate to the collective goal(s) of the lesson. Having students write these goals at the top of the document they are working on can serve as a helpful anchor that keeps them on track throughout the activity. This type of pre-lesson discussion allows students to learn to use "a language to talk *about* language – that is, to develop *metalanguage*" (Gibbons, 2009, p. 29). Developing metalanguage at an early stage is important to increase ELLs' confidence and by extension their motivation to work with academic vocabulary (de Oliveira & Schleppegrell, 2015). Effective tools that can be used to complement these discussions are graphic organizers (GOs), or "thinking sheets" (Gibbons, 2009, p. 35) that can be worked on individually or collaboratively over one or more classes, or throughout a unit of study.

Another form of front-loading discussion is "substantive conversation" or extended talk around the "big ideas" inherent in a topic or text to activate students' prior knowledge, explore new ideas, clarify their understanding, initiate questions, and make their reasoning visible to peers (Gibbons, 2009, p. 25). Front-loading students with substantive conversations leads to an increased understanding of the subject content or theme of the text they are going to read. This in turn will help them better prepare for the collocation work which involves identifying thematic vocabulary from the text. Teachers can also use substantive conversations as a strategy to formatively assess ELLs' prior knowledge as well as set individual and group language learning goals for future lessons (Zwiers, 2014).

Moving into the realm of apprenticeship learning, teachers should see themselves as "translators, or guides, who help … students shape their new ideas into the language of the discipline" (Zwiers, 2014, p. 126). As a guide, the teacher can model the skills needed for successful completion of the activity to make the learning clear or "visible" (Gibbons, 2009, p. 33). This type of teacher modelling of the task should be done at the beginning of each step listed below. All teacher modelling is then followed up with guided practice where the teacher provides students with enough formative activities, such as completing the thinking sheets where they can practice using collocations with new vocabulary to help make their points more clear. This process of modelling, discussing, and practicing how to work with collocations teaches students about the "ongoing creation of meaning" that occurs as we read a text (Halliday & Matthiessen, 2013, p. 63).

It is important to ensure that these formative activities include opportunities for students to collaborate and make their own discoveries about the language through discussions with their classmates. These opportunities to "negotiate meaning" (Gibbons, 2009, p. 134) mean that ELL students feel safe to make mistakes and are

given time to revise their work, individually or in collaboration with a peer. During collocation activities, students should be free to *play* with the language. This *playing* with language includes time for ELLs to take risks. Given students are often proficient in another language, teachers should also allow code switching. Teachers can set up collaborative student working groups (pairings and small groups) to accommodate these kinds of formative activities that are integral to building students' confidence as they move toward skill mastery.

Once these front-loading discussions have happened, students can engage in the second step of student-centered collocation work. After reading and discussing a text in an ELA class, ELLs are asked to identify 5–10 thematic words that will anchor their analysis of the text. These thematic words can be direct quotes from the text and/or theme words they have brainstormed on their own or with a partner. When completed with a partner or in small groups, this task allows the teacher to incorporate a collaborative approach from early on in order for deep learning to occur. Collaboration provides opportunities for ELLs to hear similar words or ideas expressed in a variety of ways by different peers; and the repetition helps ELLs develop a "practice of talking and reflecting on language itself" within a specific disciplinary context (Gibbons, 2009, p. 29), which leads to their enhanced understanding of the content vocabulary.

Teachers can expand these activities by allowing students to create longer academic word lists (10–100 or more words) that students can build on through a unit of study (novel, play, poetry, short stories, non-fiction, etc.). These word lists are then used as the basis for collaborative collocation activities where students work together to discover the meaning of new or challenging words they encounter while reading a text. This type of expansion activity promotes independence for ELLs through meaningful discussion and development of collective problem solving techniques, while also encouraging negotiation of meaning through code-switching and the use of cross referencing tools (denotative dictionaries, collocations dictionaries, thesauri, example sentences, etc.). Over time ELLs will begin to see themselves as *language detectives*: resourceful individuals able to confidently discover the meaning of high-level academic vocabulary without the guidance of a teacher.

After students have created a thematic word list, the next step asks them to use a collocation dictionary "in tandem with a traditional dictionary" (Woolard, 2000, p. 38) (online or offline) to select the best phrases or clauses needed to make their analysis clear. Woolard (2000) highlights the importance of explicitly teaching students how to effectively use dictionaries:

> It is becoming clear that dictionaries are underused resources in language teaching and that they must be given a greater and more central role to play in language learning. In particular, browsing the exemplifying expressions and sentences in dictionaries can provide useful information on collocations, and teachers need to encourage and train their students to approach dictionaries in this way. (p. 39)

Initially, students will use regular dictionaries to understand the definitions of words used in the context of the text they are reading. At this point, be sure to remind students to assess all of the definitions: students will often default to the first definition

listed in a dictionary thinking it is the best choice because it appears first. Here, again, we are reminded of Woolard's (2000) advice that students need explicit guidance on how to effectively use a dictionary: they must read through the list of definitions and select the most appropriate definition related to the context in which a word is used. Take for example the word *metamorphosis,* a cross-disciplinary word that is used in both ELA and science classes. If a student in an ELA class takes the first listed definition of *metamorphosis,* which is "[t]he action or process of changing in form, shape, or substance; esp. transformation by supernatural means" (*Oxford English Dictionary – OED*), they will miss the ELA specific definition that appears later: "[a] complete change in the appearance, circumstances, condition, or character of a person, a state of affairs, etc." (*OED*). The important contextual difference between these two meanings of the word *metamorphosis* could create unnecessary confusion for an ELL. This confusion could potentially disrupt their understanding of an entire passage or character within a text. To that end, while turning students into independent language detectives is the end goal, ongoing teacher guidance is necessary.

Once students have selected the appropriate context-based definitions of the words, they will proceed to use a collocations dictionary to find possible common phrasings for these words. Before starting this activity, it is important to again have explicit conversations with ELLs that explain how a collocations dictionary is organized differently from denotative or etymological dictionaries like the *Oxford English Dictionary*. Collocations dictionaries include collections of frequently used words along with the various parts of speech that commonly co-occur with those words, but they do not include *every* word in English. To that end, students need to be apprenticed through how to use these dictionaries effectively. At least one class must be devoted to introducing and practicing the use of a collocations dictionary. A good starter collocations dictionary is the print version of the *Oxford Collocations Dictionary for Students of English,* which provides some useful practice exercises that teach students how to use a collocations dictionary effectively.

The next step asks students to begin crafting their full statements of analysis (sentences) using the new vocabulary and an appropriate collocation on a thinking sheet (see an example in the implementation section). Through the use of collocations, students are able to model the same formal register of language found in the readings they encounter in their classes. The thinking sheets can be used individually or collectively to help students organize word lists, collocations, and create content-based sentences. As an expansion activity, this type of collocation exercise can be repeated later in a unit using new vocabulary as well as revisiting earlier vocabulary that may be relevant to their analysis of thematic threads that carry through an entire text.

After these steps are completed, the teacher would then take time to share ELLs' initial sentences as a class as a valuable learning opportunity to provoke discussion about the literature as well as grammar skills, including but not limited to recognizing proper phrase and clause structure, selecting the correct derivatives, etc. This process helps students recognize that writing is an art form and a craft that must be practiced. All of this leads to the sixth-step in the process: an end of cycle assessment

in the form of an essay or paragraph. One suggestion for the end of cycle assessment is to have students appropriately use at least three of the sentences from their vocabulary-collocation thinking sheets. The idea is that the collocation-sentences function as prewriting exercises that help the ELL student clearly articulate their understanding of the text during a summative assessment.

This six-step scaffolded collocation activity provides ELLs with a clear formula that they can use as they navigate the challenging waters of academic vocabulary acquisition. Each step serves as a progressive building block that apprentices ELLs as they learn how to effectively work with academic language.

4 Implementation of the Approach

The implementation of the six-step collocations activities will be illustrated using a grade 8 ELA class that studied *Romeo and Juliet,* by William Shakespeare, and a grade 9 ELA support class that studied *A Wizard of Earthsea,* by Ursula K. LeGuin. The vocabulary list from *Romeo and Juliet* highlights the value of teacher generated vocabulary lists that can be used at the beginning of a unit as a front-loading exercise. This type of early introduction to key vocabulary from the text helps students prepare for discussion and writing activities they will be asked to engage in as the unit continues. The student samples from *A Wizard of Earthsea* will look at student generated word lists that show how students have been apprenticed to become language detectives. Step-six closes with an end of year summative assessment: a compare-contrast essay on *Romeo and Juliet.* A formative expansion activity using *A Wizard of Earthsea* is included after step six and can be used to hone ELLs self-editing skills.

4.1 Step 1: Front-Loading Discussions, Tiered Vocabulary

As noted earlier, the unit should begin with substantive conversations that include explicit discussion about tiered vocabulary. This type of conversation helps students understand how words within each of the three tiers serve different social and academic functions. Once students are able to distinguish between the different levels of word use, they are better able to comprehend why certain words are more nuanced, less literal, than others. These conversations also provide teachers with an opportunity to introduce thematic words related to the text as well as formatively assess students' comprehension level and possible previous knowledge about the themes that will be examined within the unit. Following these discussions, teachers can provide students with a vocabulary list itemizing words from the text as well as words used during these initial discussions (see Table 1 for an excerpt from a longer teacher generated word list given to students at the beginning of their study of *Romeo and Juliet*).

Table 1 Teacher generated word list for *Romeo and Juliet*

Please use your Collocations dictionary (hard copy not the online copy) to complete this exercise and feel free to reference the Oxford Online Learner's Dictionary or Dictionary.com or Yourdictionary.com			
Word, part of speech, and derivatives	Definition	Collocation	Word used in a sentence related to the play
Argument			
Peace			
Enter			
Execute			
Good-looking			
Poison			

4.2 Step 2: Identifying Thematic Words from Text

Planning Prior to the lesson, review the text to highlight words you predict ELLs will find challenging. This preparation is important because while students often choose the same words you found, they also find words you may not have realized to be challenging for them. This knowledge will help you better plan and modify your lesson and your scaffolding effort. The next planning step includes using your collocations dictionary to see which of the words you have chosen are actually in the dictionary. You will likely find that some of the words you have selected are not in the collocations dictionary. Consider omitting these words from your list for the initial lesson. Once students have mastered the ability to use collocations dictionaries, you can offer methods for finding collocations for words not listed in the dictionary. Do not reveal your list to your students; rather, have them re-read the given passage to discover the new and challenging words on their own or in collaboration with peers.

Identifying Words Allow students to work individually, in pairs, or in groups. Working with others to identify challenging words can help students realize they are not struggling alone as they learn to work with new academic vocabulary. It is likely that students will discover that their selection of words is very similar to that of their peers. Awareness of this commonality can put ELLs at ease and help them feel less inhibited about asking questions and talking about words they do not understand. Allowing students to create their own word lists also provides them with a feeling of autonomy and helps promote the independence they need for later learning. Finally, working with a partner or in a small group helps students make meaning across the text through focused and collaborative study of thematic vocabulary. Table 2 offers an example of a student generated word list anchored by an essay question for *A Wizard of Earthsea.*

Table 2 Thematic word selection by students

Question: Consider the evolution of Ged's hubris in the novel and how this speaks to the classic quest narrative where the hero starts off young and naive and through trials and errors gains wisdom.	**Select** 5–10 vocabulary words from the *504 Words* (Bromberg & Liebb 2012) vocabulary book that could be used to discuss the text (written or spoken): Hardship, Qualify, Peril, Tempt, Villain, Explore, Probe, Unforeseen, Amateur
Response: In the beginning of the story, Ged is naive and unclear about his quest. Later, as the story goes on, he slowly begins to explore the mysteries and begin to understands about his quest.	
Literary devices: Identify how Le Guin uses seasonal imagery throughout the text: (1) When he is lost and confused about his surroundings and himself = Winter; (2)When he finds Vetch, it is close to Spring.	**Select 5–10 thematic words** from the text: guidance, Fear/terror, Praise, Friend, triumph

Note: From 504 Absolutely Essential Words, by M. Bromberb, J. Liebb, and A. Traiger, 2012.

Table 3 Vocabulary-collocations thinking sheet (excerpt of headings)

Vocabulary: include the part of speech and possible derivatives	Dictionary definition	Possible collocations	Craft a sentence using the word and an appropriate collocation. This sentence must be written in the formal register, and it must be related to your analysis of the text.

4.3 Step 3: Using a Collocations Dictionary

After students have identified useful vocabulary from their workbook and the text, have them record these words into the following thinking sheet (Table 3), fill in the dictionary definitions for each word, and choose between one and three collocations for each word using their collocations dictionary.

Depending on how much time you have, you can make this type of chart as long as you wish. When starting out, we recommend using a short list of 5–10 words, as learning to work with the collocations dictionary takes time. As noted earlier, teachers can expand this activity to allow students to create longer academic word lists and engage in collaborative collocation activities to discover meaning of new or challenging words they encounter while reading a text. While it may take extra time, be sure to have students practice in-text citations when completing this activity. The sooner they practice this, the better. The in-text citations assist them later on when they need to go back to their text or dictionary to clarify the context specific use of a word.

4.4 Step 4: Making Sentences/Statements of Analysis

Next, students can work with a partner to craft a sentence (or statements of analysis) using the new vocabulary and one of their chosen collocations (see Table 4 for an example). This statement of analysis should be responding to the text under

Table 4 Excerpt of section of student generated vocabulary list with collocations and sentences for *A Wizard of Earthsea* (written online using Google docs)

Word, part of speech (n, v, adj., adv.), and derivatives	Definition	Possible collocations	Word used with the collocation in a sentence related to the novel.
Hardship (n.)[a]	Something that is hard to bear; difficulty	Considerable~	Ged becomes a great wizard after facing considerable hardships.
		Cause~	
		Face~	
		Without~	
Qualify (v.)	Become fit; show that you are able	Easily~	Initially, Ged did not easily qualify as a wizard: he was courageous, but had to also learn to become thoughtful.
		Hardly~	
Peril (n.)	Great danger, or something that is very dangerous	Deadly~	Even when Ged is facing deadly perils, he remains calm and positive.
		Great~	
		Face~	

[a]From *504 Absolutely Essential Words*, by M. Bromberg, J. Liebb, and A. Traiger, 2012.

examination and should show that the students know how to use the new word and collocation within the appropriate context. Please note that it may take students a long time to design these sentences, especially at the beginning. Here teachers need to pop into conversations during peer work to offer guidance related to grammar and structure. These conversations may include reminding students about past grammar lessons and/or guiding them to look back at their grammar and language workbook to deduce the appropriate structure on their own.

Once students have completed the sentences section using the new vocabulary and an appropriate collocation, it is time to show them how these sentences can be used during summative assessments, such as in-class paragraphs, essays, or projects that require students to write full sentences in the academic register. Note that once the students learn how to complete these thinking sheets on their own, they can work collaboratively or on their own to create longer vocabulary lists. These lists eventually become useful word banks for students prior to in-class summative assessments.

4.5 Step 5: In-Class Group Sharing

Next, use the newly crafted sentences from the thinking sheet to write a co-created expository paragraph or essay. Given that the words and sentences are always thematically anchored by the content of a text, it is a relatively smooth transition to move from a collection of well-crafted sentences to a co-created piece of analytical writing. This co-creation step introduces students to the skills of organizing their ideas as well as effectively using transitions to move fluidly from one sentence to the next. As the essay or paragraph is being created, students can review their own

sentences and offer those that are thematically appropriate to the co-created paper. This formative step is very effective as a method of apprenticing ELLs through the writing of in-class assessments. Teachers can facilitate co-created papers on a Google doc using the teacher's computer and projecting the doc through an LCD projector. This Google doc should be shared with the class once the paper is complete to serve as a reference for later writing.

Keep in mind that co-created writing takes time, and teachers need to be prepared to set aside one, or possibly two or more classes for this activity. But the learning that comes out of this step is invaluable. While teacher guidance is needed throughout this process, try to encourage students to make most of the decisions through discussing vocabulary and concepts as well as negotiating meaning. In your role, remind students about previously learned skills and encourage them to support each other through the application of this prior learning,

4.6 Step 6: End of Cycle Summative Assessment

After a formative co-created paper has been completed, students should be ready to complete an literary response essay or paragraph on their own. Once students are familiar with completing collocations in the thinking sheets, aspects of collocation activities can be integrated into summative assessments to support the process of working with academic vocabulary in ELA. Table 5 illustrates an example of a summative assessment (an in-class, compare/contrast essay) that builds on the previous work students completed during their study of *Romeo and Juliet*. Please note that while the analyses are strong and the collocations are clear, langauge errors do persist in each of the following student samples.

5 Formative Expansion Activity Using *A Wizard of Earthsea*

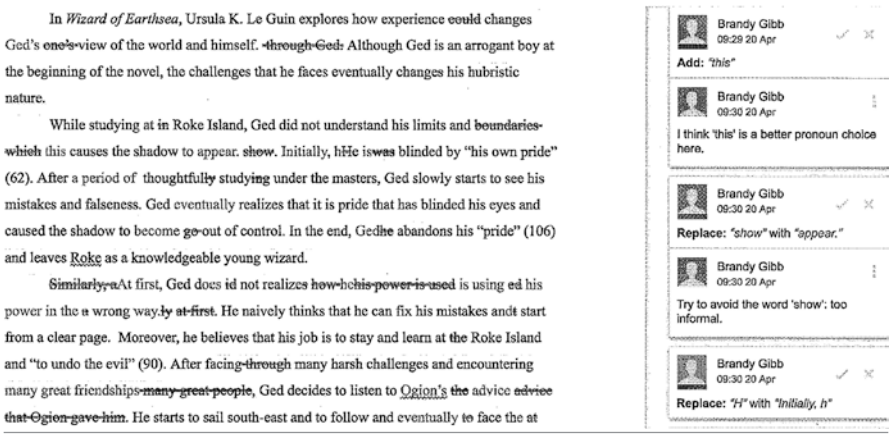
Before we close, we would like to leave you with an expansion activity that can be used to complement the above six steps. The following adds a step that engages students in a process of self-editing followed by formative teacher feedback on both the quality of the essay and the editing choices made by the student. This expansion activity was completed with grade 9 ELLs who were already familiar with the above six steps.

This formative activity asks students to revisit and edit their own writing, a skill that encourages ELLs not to be afraid of their errors but see them as learning opportunities. The student example that follows (Table 6) was based on their study of the novel *A Wizard of Earthsea,* by Ursula K. LeGuin. The student wrote the paper in an 80-min class, left the paper for 2 days, and returned to the paper with fresh eyes to complete the editing process. This particular student focused her editing on subject-verb-agreement errors as well as appropriately using the third person singular *-s* form of verbs: two errors in her writing that she was determined to master. The type

Table 5 Example of a summative assessment (student-selected vocabulary have been highlighted in the text)

Romeo and Juliet Essay
Question: Compare and contrast Romeo and Juliet and consider who is the real protagonist of the play.
Since Juliet is the character who pushes forward the plot and changes the most throughout the play, she is the real protagonist due to her **intelligence** and the deep love she has to Romeo. Even though Romeo and Juliet both play important roles in Shakespeare's play *Romeo and Juliet*, Juliet has more significant contributions to the structure of the play.
In the play, not only Juliet **suffers** from the family **hatred**, but also her lover, Romeo. Both of them are willing to give up everything for their **love**, even their family and names. Romeo refers his name as "saint" (2.2.55), which he can give up anytime if it is needed to gain the love from Juliet. Similarly, Juliet is willing to **fake** her death and lie beside a "chapless skulls" (4.1.83) without fear to meet her sweet love. Without **hesitation**, Juliet drinks the potion and sleeps deeply, which looks like she is dead. Because of their family hatred, a pair of in loved couple uses their lives to fix the relationship of their parents, and be remembered after their deaths for their **tremendous** and **unforgettable** love.
Even though both Juliet and Romeo deeply fall in love with each other, Juliet, as the real protagonist **sacrificed** a lot for Romeo. However, all Romeo does for Juliet is causing never ends problems. Romeo kills Juliet's cousin due to his **recklessness**. Although he realizes that he is a "fortune's fool" (3.1.32) afterward, he still causes Juliet to make hard choice, which is to choose between her cousin and her love. On the other hand, Juliet who describes her wedding bed as her "grave" (1.5.134) falls in love with Romeo. She wants to be with Romeo without **considering** of their parents hatred and she also leaves out her **horrible** situation. She keeps helping to **solve** the problems Romeo has caused for her and still loves Romeo. Juliet's highlighted love is clearly shown when she decides to marry Romeo and chooses to love him even after he kills her cousin. In contrast, Romeo's love to Juliet creates many difficult problems for Juliet.
As a protagonist, Juliet tries to **overcome** the family hatred and gives up a lot for her love, Romeo who is supposed to be her enemy. However, Romeo just stays **reckless** throughout the play.

Table 6 Student and teacher edited essay (student edits noted with a strike-through; teacher edits are in the side panel)



In *Wizard of Earthsea*, Ursula K. Le Guin explores how experience ~~could~~ changes Ged's ~~one's~~ view of the world and himself. ~~through Ged.~~ Although Ged is an arrogant boy at the beginning of the novel, the challenges that he faces eventually changes his hubristic nature.

While studying at in Roke Island, Ged did not understand his limits and ~~boundaries which~~ this causes the shadow to appear. ~~show~~. Initially, ~~hHe~~ is~~was~~ blinded by "his own pride" (62). After a period of thoughtfully~~y~~ studying under the masters, Ged slowly starts to see his mistakes and falseness. Ged eventually realizes that it is pride that has blinded his eyes and caused the shadow to become ~~go~~ out of control. In the end, Ged~~he~~ abandons his "pride" (106) and leaves Roke as a knowledgeable young wizard.

~~Similarly,~~ At first, Ged does ~~id~~ not realizes ~~how he his power is used~~ is using ~~ed~~ his power in the ~~a~~ wrong way.~~ly at first~~. He naively thinks that he can fix his mistakes and~~t~~ start from a clear page. Moreover, he believes that his job is to stay and learn at ~~the~~ Roke Island and "to undo the evil" (90). After facing ~~through~~ many harsh challenges and encountering many great friendships ~~many great people~~, Ged decides to listen to Ogion's ~~the~~ advice ~~advice that Ogion gave him~~. He starts to sail south-east and to follow and eventually ~~to~~ face the at

Brandy Gibb 09:29 20 Apr
Add: *"this"*

Brandy Gibb 09:30 20 Apr
I think 'this' is a better pronoun choice here.

Brandy Gibb 09:30 20 Apr
Replace: *"show"* with *"appear."*

Brandy Gibb 09:30 20 Apr
Try to avoid the word 'show'; too informal.

Brandy Gibb 09:30 20 Apr
Replace: *"H"* with *"Initially, h"*

of teacher feedback provided included corrections, suggestions, and encouragement for good editing choices made by the student. This type of feedback helps ELLs feel safe making mistakes with their writing and see writing as a process rather than a product.

6 Conclusion

The six-step collocations activities provide ELLs with an accessible formula that can be used to decipher the complexities of academic writing and the appropriate vocabulary used therein. This process of working with collocations helps students recognize that writing is an art form and a craft that takes time to master and requires constant practice. If the process is clear and well scaffolded, students will find success in their work with challenging academic vocabulary.

Collocations activities provide ELLs with the opportunity to discover the meanings of words in relation to other words. Working collaboratively with their peers and under the guidance of an ELA teacher, students can use collocations activities to become vocabulary detectives. Working together they learn how words can function literally, metaphorically, and/or thematically across of variety of contexts. Throughout this process students are also encouraged to take risks and play with the language. The teaching and learning environment must allow ELLs the freedom to make mistakes and assist one another in achieving a deeper understanding of the language.

The purpose of using collocations activities is to build the ELL's intuitive use of academic English and by extension build their confidence. This confidence helps to foster their intellectual curiosity and hopefully motivate them to take risks when exploring new vocabulary. Collocations activities help eliminate the intimidation and tediousness of learning academic vocabulary by rote; instead, these activities anchor new vocabulary within meaningful contexts. The above activities were designed to provide ELLs with resources to help them build independence in their ability to discover meaning on their own. Through these activities, ELLs learn to consider the relationship between the form, function, and meaning of academic language, which will equip them with a well-stocked academic toolkit full of the skills they need to tackle any and all new academic vocabulary they encounter.

Reflection Questions

1. While online platforms like Google docs are incredibly useful when working collaboratively, research does support the connection between handwriting and cognitive development related to long term memory, a valuable asset for language acquisition. In this age of technology innovation in the classroom, how do we find a balance between good old fashioned paper and pen and useful online teaching tools? Further, how do we convince students about the value of slowing down and collaborating with paper and pen?

2. Grammar books for ELLs are filled with cloze tests. How could cloze tests be designed to include collocations? What would the benefits of this be as a recursive activity to keep newly learned vocabulary fresh in the minds of students?
3. When working with ELLs, culturally responsive educational practice is essential to creating harmony in our classrooms, and sometimes sharing of work or working collaboratively is not a cultural norm for ELLs. To that end, how can we use formative activities to invite students into collaborative situations where they feel safe sharing, making mistakes, and by extension learning?

Suggested Resources

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A Genre-Based Approach to Teaching Argument Writing

Kathleen Ramos

Abstract This chapter provides an authentic classroom example of a research-based approach that secondary ESOL/ELA teachers can apply to teach ELLs from diverse cultural, linguistic, and educational backgrounds to write an academic-style, authoritative argument. Using the teaching and learning cycle (TLC) of genre pedagogy, teachers can make visible and tangible the language tools, or academic language resources, that ELLs can employ to write well in this critical genre. Grounded in theories of language and learning, teachers can use the TLC to design and implement instruction that strengthens ELLs' academic language and literacy development while supporting learning of grade-level disciplinary content.

All educators committed to effectively teaching English language learners (ELLs) can herald the emphasis in the Common Core State Standards (CCSS) (http://www.corestandards.org/) on the role of language in communicating and reshaping human experience and knowledge as a welcome enhancement to teaching and learning. This emphasis on language across disciplinary areas positions all teachers as language and literacy teachers. Thus, all teachers share the responsibility for supporting ELLs and other learners in gaining academic content knowledge while developing academic language and literacy practices (de Oliveira, 2016; Gibbons, 2009, 2015).

A key genre in the CCSS in which all K-12 learners must develop reading and writing competence is the argument genre. Moreover, reading and writing well in this genre is required in college (Hirvela, 2013). In this chapter, I describe a framework that secondary ESOL/ELA and other content area teachers can implement to apprentice ELLs with varied language and literacy strengths to the academic language resources that function to write academic-style authoritative arguments.

Designing instruction that apprentices ELLs and other learners to develop academic literacy practices while learning content can represent a challenge for secondary teachers (Fang & Schleppegrell, 2008). Language and literacy scholars have

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provided succinct principles to guide teachers in planning instruction that can support ELLs in reaching rigorous content and academic language learning goals (http://ell.standford.edu). These principles include teaching ELLs to construct meaning from complex texts and to write well in a variety of academic genres and emphasize the social nature of learning. Thus, all teachers should invite students to listen, speak, read, and write collaboratively.

One promising approach for designing such instruction is the genre-based teaching and learning cycle (TLC), developed through extensive research with teachers in schools by educational linguists in Australia (Christie, 2012; Martin, 2009; Martin & Rose, 2005, 2008; Rose & Martin, 2012).

1 Approach to Teaching English Language Arts to ELLs: The Teaching and Learning Cycle-An SFL Genre-Based Approach

The genre-based TLC, grounded in the theory of *systemic functional linguistics* (SFL), provides secondary ESOL/ELA and other teachers with a clear instructional pathway for supporting ELLs and other learners in developing control over academic language and literacy practices while meeting grade-level content goals (Rose & Martin, 2012). In the U.S., SFL-based genre pedagogy is gaining recognition as a research-based framework that educators can implement in order to integrate content learning and academic language development goals (Brisk, 2015; de Oliveira, 2016; de Oliveira & Iddings, 2014; Fang & Schleppegrell, 2008).

The TLC, at the heart of SFL-based genre pedagogy, comprises three phases: Deconstruction, Joint Construction, and Independent Construction (de Oliveira & Lan, 2014). Central to the TLC framework is the notion of "guidance through interaction in the context of shared experience" (Rose & Martin, 2012, p. 58). Using the TLC, secondary ESOL/ELA teachers design instruction around a school-valued genre (e.g., historical explanation, argument) in which learners need to read and write successfully.

Each *genre* has a social purpose, shaped by culture, that unfolds in a typical way through the author's choice of language options (e.g., structures, patterns, lexical choices) that function to create three meanings simultaneously: conveying the content, meeting audience expectations, and presenting a coherent message (Schleppegrell, 2006). Thus, instruction focuses on making explicitly visible the academic language resources that function to realize these three overarching meanings in a target genre. Through the TLC lessons, ELLs learn that these three meanings are also shaped by the register variables of what the text is about, the relationship between the author and readers as well as the author's judgment of the topic, and the organization of the text (Rose & Martin, 2012).

I begin with a description of the purpose and activities associated with each phase of the TLC. Next, I provide the theoretical foundations of SFL-based genre

pedagogy. Finally, I share a rich example of the way I applied this framework in a secondary ESOL classroom to support a group of adolescent ELLs from varied cultural, linguistic, and educational backgrounds in reading and writing academic-style, authoritative arguments (Ramos, 2014, 2015).

1.1 Deconstruction

An integral part of the Deconstruction phase is building field, or ensuring that learners have ample background knowledge about the topic to be explored in the genre-based lessons. For example, to develop arguments either for or against using hydrofracking to extract natural gas from layers of rock deep below the Earth's surface, students would need to learn about the process of hydrofracking and explore both sides of this environmentally controversial issue. Building field is crucial for ELLs whose background knowledge may be culturally distinct from topics presented in school curricula (Gibbons, 2015).

During Deconstruction, learners explore the genre's social purpose and typical organizational structure. For example, one school-valued argument format begins with an introduction containing a thesis statement and presentation of the author's central arguments. The author then develops each central argument in separate body paragraphs. Finally, the author offers a conclusion that reiterates the main arguments and connects back to the thesis statement (Schleppegrell, 2006). The teacher can situate this introduction to the purpose and structure of a specific genre by using a model text on the topic of focus. In this way, the teacher presents the genre of focus in a contextualized way that builds field about the topic.

Next, the teacher facilitates a close look at sentence-level meaning through the lens of language and introduces the metalanguage, or language for talking about the academic language resources that function to create the three overarching meanings (conveying the content, meeting audience expectations, and presenting a coherent message), in the model text. That is, the teacher makes visible the way that academic language resources function to write successfully in this genre while also building metalinguistic awareness to support meaning making during reading.

1.2 Academic Language Resources of Written Arguments

During deconstruction, the teacher introduces ELLs to the key linguistic features, or academic language resources, for presenting and developing arguments in an authoritative, logical way in an organized text. For example, the academic language resource of *nominalization*, or turning a verb or an adjective into a noun, is a key resource for presenting an academic-style, authoritative argument (Fang & Schleppegrell, 2008; Schleppegrell, 2006). Consider the argument, *The legalization of undocumented immigrants will strengthen the U.S. economy.* Adolescent ELLs

who have not yet gained control over academic writing practices may typically write this argument in spoken-language style in a sentence such as, *I think the U.S. should make undocumented immigrants legal because then they can work and help make the economy stronger*.

Drawing attention to nominalization, the teacher can explain that *the legalization of undocumented immigrants* presents an action (giving legal status to) as a noun (an act). The teacher can further explain that this realization of an action as an act functions to allow the author to make an assertion in an academic way and to judge the act's outcome in an authoritative manner that strengthens the author's persuasion. For example, the teacher can draw ELLs' attention to the function of the author's choice of the modal *will* and emphasize how the strength of this argument would change if the author had chosen *might* in place of *will*. Strong modality that suggests the author's certainty is another key academic language resource for presenting arguments authoritatively (Schleppegrell, 2006).

From there, learners can consider the author's positive stance toward legalizing undocumented immigrants through discussing the choice of the causal link *strengthen* to convey this author's judgment about the effect on the U.S. economy of legalizing undocumented immigrants. An author's *appraisal*, or evaluative language choices that convey judgment, is another key linguistic resource in argument writing (Schleppegrell, 2006). For instance, the author may follow the above sentence with, *Undoubtedly, legal citizens are more likely to pursue higher education, open businesses, and create innovative products and services.* The teacher can guide ELLs to consider the way that the adverb *undoubtedly* as well as the positive connotations of the verbs *pursue, open, create,* and the adjective *innovative* all contribute to conveying the author's positive judgment toward legalizing undocumented immigrants.

Through Deconstruction, the teacher can highlight the way that conjunctions, synonyms, and referents are other key academic language resources that function to build a cohesive, well-organized argument (Christie, 2012; Schleppegrell, 2006). For example, after reading the next sentence, *In turn, these contributions serve to improve the overall economy,* the teacher can emphasize that *in turn* functions to develop the author's argument in a logical way by linking ideas to build a chain of reasoning. The teacher can highlight that *these contributions* renames, or refers back to, the actions named in the previous sentence (e.g., pursue higher education, open businesses).

Another key linguistic resource for developing written arguments is the use of *mental* and *verbal processes*, or thinking and saying verbs, to introduce others' voices to either support or counter the argument (Schleppegrell, 2006). This academic language resource can be explored in the next sentence: *Economists broadly agree that full participation by immigrants in our society will improve, not harm, our nation.*

This focused attention to the function of academic language resources makes visible the academic language tools that ELLs can apply in their own argument writing. Moreover, building metalinguistic awareness through discussion can support ELLs in comprehending the text. Furthermore, this contextualized interaction opens

a space for students to critically analyze and evaluate an author's judgment of the topic of an argument (Rose & Martin, 2012).

1.3 Joint Construction

In the Joint Construction phase of the TLC, the teacher and students collaborate to co-construct a similar text on the same topic in the target genre. The purpose is to provide an additional level of scaffolding around the use of the academic language resources for writing in this genre (de Oliveira & Lan, 2014). Collaboratively, the teacher and students leverage expanded knowledge about the topic and employ the academic language resources that function to convey the content, meet audience expectations, and present a coherent message to write a new argument text.

This collaboration provides another space for explicit discussion of the function of these academic language resources (e.g., nominalization, strong modality, causal links, evaluative language, conjunctions, synonyms, and referents) while picking up these language tools and putting them to work to co-create an academic-style argument. Students can work together to explore options and propose ways to present and develop arguments using the academic language resources while the teacher acts as scribe. This visible instruction around the way that academic language resources function to build meanings in a specific genre apprentices ELLs to academic ways of reading and writing (Brisk, 2015; de Oliveira & Iddings, 2014; Gibbons, 2015).

1.4 Independent Construction

During Independent Construction, learners apply what they have learned through scaffolded interactions around reading and writing in a particular genre to write independently (de Oliveira & Lan, 2014). In the present example, learners would employ their growing knowledge of the academic language resources that function to build meanings in the argument genre to develop an independently written argument either for or against amnesty for undocumented immigrants.

This independent writing can represent a formative assessment of students' progress toward learning to write well in the target genre. The teacher can allow interaction among students and with her during writing. Students can access scaffolds such as the model text(s) and other resources explored during Deconstruction and Joint Construction as they organize their thinking and prepare to write. Writing independently apprentices ELLs in gaining control over the academic language resources in the target genre (Rose & Martin, 2012).

I now describe the theoretical foundations of this apprenticeship model to reading and writing in academic ways.

2 Theoretical Foundations of the Approach

Genre pedagogy is anchored in decades of research with teachers and K-12 language-minority learners in schools in Australia (Christie, 2012; Christie & Martin, 2007; Rose & Martin, 2012; Rothery, 1996) and in the United States (Brisk & Zisselsberger, 2011; de Oliveira & Lan, 2014; Gebhard, Harman, & Seger, 2007). This work has supported teachers in deepening their knowledge about the way that academic language resources function to create meanings in school-valued genres in order to apprentice ELLs and other learners to read and write successfully in these genres. This extensive body of research is informed by a theory of language (Halliday, 1993), sociological theory (Bernstein, 1990, 2000), and sociocultural theory (Vygotsky, 1978).

In his theory of language, Halliday (1993) emphasized that teaching literacy means explicitly teaching the way that language functions in human communication, shaped by culture, for distinct social purposes. When teachers plan reading and writing tasks, language is a central tool for supporting learning about language through content and learning content through language. From this premise, it follows that teachers need deep knowledge about the way that academic language resources function to create meanings across genres in order to apprentice students to academic language and literacy practices (Christie & Dreyfus, 2007; Christie, 2012).

Consider again writing on the topic of hydrofracking. The way that language would be used to develop an argument for or against hydrofracking is quite distinct from the way that learners would use language to delineate the processes, or steps, that occur when hydrofracking takes place. For instance, in a sequential explanation of what occurs during hydrofracking, a learner would not write, *Obviously, the next step in this environmentally damaging process is to inject a toxic mixture of water, chemicals, and sand deep into the Earth, which can poison living things*. The adverb *obviously* and the evaluative language choices *environmentally damaging*, *toxic*, and *poison* are not language resources that function to unfold a step-by-step process. Rather, students would need to use language in a non-judgmental way to delineate each step.

Another central premise of genre pedagogy is the notion of making the way that academic language resources function visible to all learners (Bernstein, 1990, 2000). An educational sociologist, Bernstein (2000) argued that an invisible pedagogy often exists in schools in which academic ways of reading and writing are implicit rather than explicit and thereby hidden from children from working class and language-minority backgrounds. Yet, these academic language practices are often visible to students whose out-of-school language and literacy practices align with those of the school.

Language-minority learners can benefit from an explicit pedagogy around academic reading and writing practices (Bernstein, 2000; Rose & Martin, 2012). This visible pedagogy is a matter of social justice in light of the reality that post-secondary career and educational pursuits hinge upon strong control of academic language and literacy practices (Schleppegrell, 2004). In genre pedagogy, a core aim is to

strengthen *all* learners' preparation for pursuing post-secondary pathways in a more equitable way (Rose & Martin, 2012).

This pedagogy has deep roots in *sociocultural theory* (Vygotsky, 1978). In SCT, the *zone of proximal development* (ZPD) reflects the distance between what learners can accomplish on their own and what can be achieved through appropriate guidance or collaboration with more capable peers, including the teacher (Vygotsky, 1978). Additionally, the concept of scaffolding (Bruner, 1986) is important for apprenticing learners to gain independent control over academic language and literacy practices. Teachers can scaffold the development of academic language and literacy practices through explicit experiences that make visible the academic language resources of a particular genre by using the TLC (de Oliveira & Lan, 2014; Rose & Martin, 2012).

Skillfully reading and writing arguments is an advanced literacy practice necessary for academic success both in secondary and post-secondary settings (Hirvela, 2013; Schleppegrell, 2006). Schleppegrell argued that current K-12 writing rubrics emphasize that students must learn to make appropriate word choices, develop a consistent point of view, and use effective transitions in order to write coherent arguments. Yet, the academic language resources that function to meet these expectations are often left invisible to ELLs and other learners.

In secondary classrooms, ESOL/ELA and other teachers can employ the TLC to strengthen reading and writing practices in school-valued genres in a principled way. I now provide a concrete example of how the TLC can be applied to support ELLs in strengthening control over the academic language resources that function to present an academic-style, authoritative argument.

3 Implementation of the Approach

In my previous work as a secondary ESOL teacher, I taught adolescent ELLs from widely varied cultural, linguistic, and educational backgrounds. One consistent challenge in this work was supporting adolescent ELLs in learning to write in a way that would allow them to meet graduation requirements and prepare to study at 2-year or 4-year colleges, which many aspired to do. It was clear to me as an ESOL educator that ELLs needed explicit guidance in learning to shift from writing in spoken-style language to writing in an academic way. I was intrigued by the potential for using the TLC to provide this guidance. (For a more detailed description of this research, see Ramos, 2014, 2015).

In one class, I taught 20 adolescent ELLs from seven different cultural and language backgrounds. Sixteen of the students were resettled refugees from interrupted formal schooling backgrounds. Two of the non-refugee students also received special education services and had attended U.S. schools for 9 years. The other 18 students were pupils in this school district for 1–5 years, the majority for 3 years or less. The students' English language literacy levels ranged from Level 3 Developing to Level 5 Bridging (www.wida.us). Generally, ELLs at Level 3 can write at the

paragraph level using some content-specific language with some complexity in syntactical sentence patterns and are moving toward gaining control over producing extended discourse using technical and abstract language in a variety of sentence patterns (www.wida.us).

I focused on the argument genre given that writing effective arguments was an expectation in ELA and other content areas. Writing effective arguments was also required on standardized tests and would be necessary in college. Furthermore, classroom writing tasks to argue for a particular viewpoint indicated that these ELLs needed further support in writing academic-style arguments. I planned the unit around the topic of whether amnesty should be granted to undocumented immigrants, a theme that I believed would be relevant to these adolescent learners. Figure 1 below (de Oliveira, 2017) depicts the way I employed the TLC in this instructional unit.

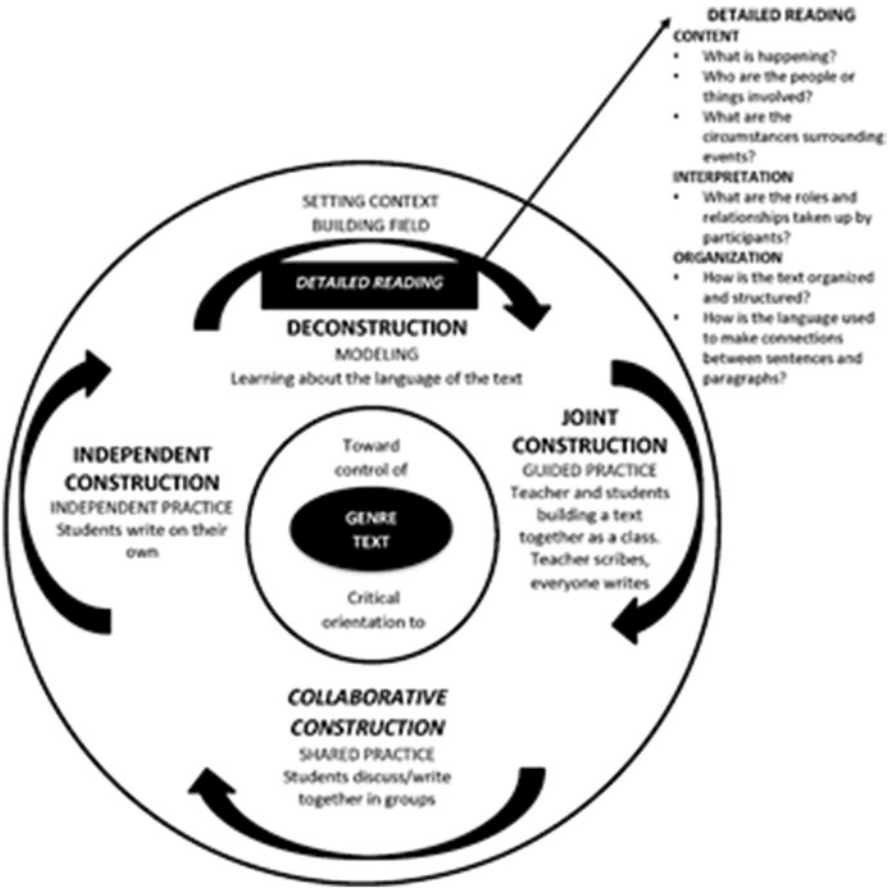

Fig. 1 Implementation of the TLC. (de Oliveira, 2017)

We began the Deconstruction phase by reading a variety of texts from reliable online sources around what amnesty is, why it is a politically controversial subject, and what the various arguments for and against amnesty are. One text defined and explained the process of amnesty from a legal standpoint. Other texts presented both pro and con perspectives on granting amnesty. We also watched a video portraying the social and economic reasons that drive some families from Mexico and Central America to attempt to enter the U.S. without documentation.

Reading these texts through whole group, small group, and pair activities built background around the pros and cons of amnesty for undocumented immigrants. These lessons also prompted critical examination of the role of evaluative language in written arguments. For example, we considered why a "pro" amnesty author used the term *undocumented immigrants* while a "con" amnesty author chose the term *illegal aliens*. Furthermore, these building field lessons provided learners with an opportunity to grapple with academic vocabulary and culturally laden terms such as *contentious*, *political hot potato*, and *proponents* and *opponents*. For example, after discussing the expression *political hot potato* in a text, I invited students to name other *political hot potato* issues currently in the media. Their responses included, "if you can have a gun or not," and "getting the gas from ground" (Ramos, 2012, p. 114).

Next, I introduced the ELLs to the social purpose and typical schematic structure of the argument genre. Following Schleppegrell (2006), I acquainted the students with the way that authors create the three overarching meanings at the same time (see Fig. 2 below).

We took our time to discuss the chart, and I assured students that they would learn to use the specific academic language tools that function to create these meanings in an academic-style argument. I used a pro-amnesty model text to outline the genre's structure by labeling the introductory paragraph with thesis statement and presentation of arguments, the body paragraphs in which each argument was developed, and the concluding paragraph that reiterated the thesis statement. During these lessons, the ELLs worked together to share their thinking around the social purpose of writing in the argument genre. Students' responses included *propose*

Type of Meaning	How Writers Develop this Type of Meaning
Presentation of Content and Knowledge: Realizing Purposes	*State thesis strongly and clearly *Present arguments to be developed *Introduce and refute counter-argument *Define key terms
Projection of Authoritative Stance: Meeting Audience Expectations	*Present stance w. authority but impersonally *Convey evaluation and judgment of the topic *Include others' voices that support or challenge the main argument
Construction of a Well-Organized Text: Building Coherence	*Arguments clearly stated in introduction *Arguments developed in separate paragraphs *Logical "chain of reasoning" links arguments together

Fig. 2 Introducing the argument genre

solutions to problems, *persuade people to change their minds about important issues*, and *change the world through thinking* (Ramos, 2012).

Next, the students and I deconstructed model argument essays both for and against amnesty, written by me, in which I had employed the academic language resources that function to present content and knowledge, project an authoritative stance, and construct a well-organized academic argument. As we read model texts together, we referred to a color-coded visual representation of an academic language toolbox (Ramos, 2014, 2015) to name, label, and discuss the function of the academic language tools in realizing the three meanings simultaneously. Although not in color here, Fig. 3 below illustrates the way that we labeled and color-coded some of the key academic language resources in the pro-amnesty model text.

As Fig. 3 indicates, we used colors to identify and label the *nominalizations*, *modals*, and *causal links* that functioned to present an argument and judge its outcome in an authoritative way. We highlighted the evaluative language sprinkled throughout the text to create a visual display of the way words like *prosper* and *hard-working* served to convey the author's positive stance toward amnesty. We labeled the use of conjunctions like *furthermore* that functioned to build a chain of reasoning within and between paragraphs. To foster metalinguistic awareness of other academic resources that contributed to cohesion, we color-coded referents and synonyms in the text.

For example, after reading the paragraph in Fig. 3, I asked the students to identify a synonym for *millions of undocumented workers*. One student said, "This steady labor force." I affirmed that response and elaborated, "When I write *this steady labor force*, I am indicating that I already introduced this idea. As the reader, you know I'm not introducing a new idea …By *this steady labor force*, I mean the millions of undocumented workers" (Ramos, 2012, p. 175).

Together, we explored the way that the author used mental and verbal processes, or thinking and saying verbs, such as *believe*, to introduce her own or others' voices in the

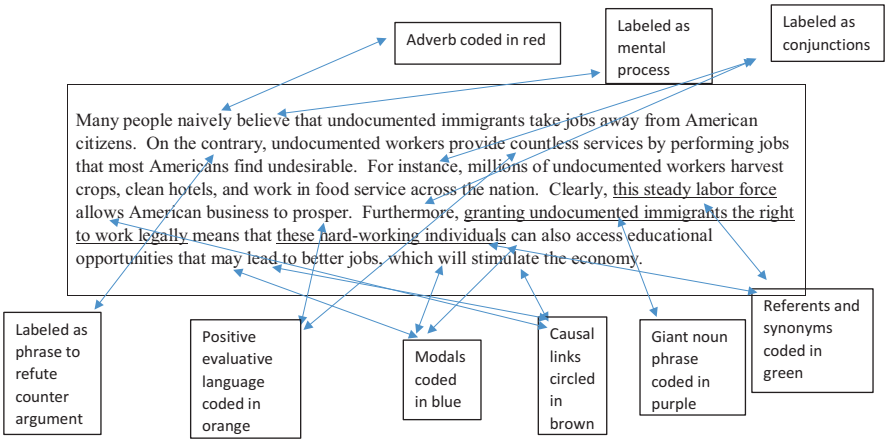

Fig. 3 Coding academic language resources

argument. We studied the function of phrases such as *on the contrary* to refute counter-arguments in this genre. For instance, I explained that by using *on the contrary* I was refuting the belief that undocumented immigrants were taking jobs from Americans. A student asked, "Is that the only way you could refute?" and I introduced other language resources for refuting such as, *actually* or *in reality* (Ramos, 2012, p. 174).

This collaborative deconstruction of a model text, scaffolded by dialog, labeling, and color-coding, offered an explicit, visible pedagogy that helped to build ELLs' metalinguistic awareness of the function of the academic language resources at work in this genre. It was heartening to me as the teacher that this attention to the function of academic language resources also supported the ELLs in comprehending and critically analyzing the texts. This kind of metalinguistic discussion during reading gave students an opportunity to think deeply about the way that the author's lexical and syntactical choices worked to present and develop the arguments in an authoritative, convincing way.

For example, when we turned to the against-amnesty essay, I read the essay aloud as students read along, as I had done with the pro-amnesty essay. When I finished reading, there was an audible expression of consternation as the students reacted to the author's negative stance toward granting amnesty for undocumented immigrants. One student said, "Wow. This one seem more powerful than the first one." Another student asked, "What if it's not true?" "How can your writing be accurate if it's not true"(Ramos, 2012, p. 235)?

These responses led to a rich discussion of the way that readers must be critically aware of the power behind an author's language choices. We discussed the author's assertion that *proponents of amnesty mistakenly believe that granting amnesty to more than 15 million illegal aliens will put an end to this tidal wave of illegal entry into the U.S*. In deconstructing this sentence, students noticed the power of negative evaluative language, such as *illegal aliens* and *tidal wave of illegal entry* to "paint a different picture" of undocumented workers. One student observed, "*Tidal wave* is like synonym for *this gigantic illegal workforce,*" a noun phrase we had encountered in another paragraph in the against-amnesty text (Ramos, 2012, p. 246).

One critique of SFL-based genre pedagogy has been that it can stifle creativity and may lead students to reproduce the genres of the dominant culture (Cope & Kalantzis, 1993). Yet, a critical orientation to text is located at the center of this approach. Thus, supporting language-minority students in developing the linguistic muscle and academic literacy strengths to comprehend, critique, and create texts is an equitable approach to teaching and learning (Hasan, 1996; Martin & Rose, 2005).

After the Deconstruction phase, the students and I embarked on collaboratively taking up the academic language resources to write a new argument on the same topic in the Joint Construction phase. Collectively, the students decided that we would write a pro-amnesty argument. Through discussion, we decided upon the arguments to develop. We then collaborated to discuss and refine authorial choices around the academic language tools in order to create an academic, authoritative argument essay.

In the Independent Construction phase, the students wrote their own argument texts either for or against amnesty. Students interacted with me and with one another

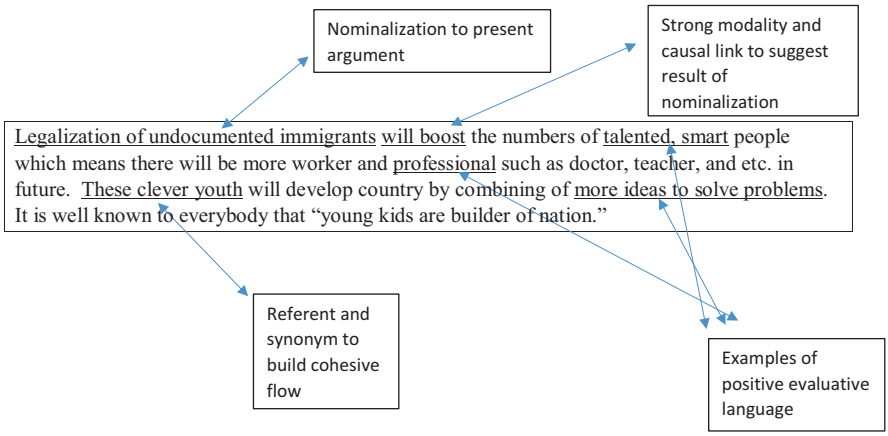

Fig. 4 An example from independent construction

and used all of the resources from the unit as scaffolds during writing. In Fig. 4 below, I share the preliminary draft of a body paragraph that one student wrote to develop his first argument:

This excerpt reveals that this student employed several of the academic language tools that function to present and develop an argument in an authoritative way. During this instructional unit, the ELLs' writing shifted sharply away from spoken-style writing toward stronger control of the academic language resources that function to create meanings in the argument genre (Ramos, 2014, 2015). In fact, one student shared a story with the class about his older sister who attended the local community college and recently commented that she had an assignment to write an argument text but did not know how. This student said, "But me, now I know."

4 Conclusion

The role of language in instruction that aims to prepare students for college and career readiness is central in the CCSS. Secondary ESOL/ELA teachers have long embraced the responsibility to strengthen learners' academic language and literacy practices in preparation for pursuing post-secondary education and careers.

Yet, building academic language and literacy practices with adolescent ELLs from varied cultural, linguistic, and educational backgrounds is challenging work (Hirvela, 2013). The genre-based TLC is one promising framework for approaching this critical goal. Secondary ESOL/ELA teachers can plan thematic instructional units that aim to create a visible pedagogy that provides a pathway for strengthening ELLs' academic language and literacy practices through contextualized lessons focused on reading and writing in key genres (Fang & Schleppegrell, 2008). Moreover, genre pedagogy can open the door to cross-curricular planning with teachers in other disciplines, such as history and science.

Planning this type of instruction requires that teachers and the teacher educators who prepare them have strong knowledge about the way that academic language resources function to create meanings in specific genres. Recently, literacy scholars have called for teacher educators to support all teachers in developing *pedagogical language knowledge*, or an understanding of how to include attention to the role of language in literacy instruction across disciplines (Bunch, 2013). A growing body of research and professional development initiatives in the U.S. support developing teachers' knowledge about language through a functional linguistic lens (de Oliveira, 2016; de Oliveira & Lan, 2014; Schleppegrell & de Oliveira, 2006).

Educators at all levels can deepen their knowledge about SFL-based genre pedagogy through reading the current literature portraying the implementation of this approach in real classrooms with ELLs (Brisk, 2015; de Oliveira & Iddings, 2014; de Oliveira & Schleppegrell, 2015; Gibbons, 2015). Pursuing one's own professional learning is a lifelong responsibility. The journey to deepen our own expertise for supporting ELLs to read and write effectively across school genres is a worthwhile endeavor.

I conclude with the words of a ninth-grade Somali female student who reflected on the TLC lessons focused on writing academic-style arguments:

> I have learned a lot from writing these essays. Not just writing a persuasive essay, but writing in like any genre of writing. Like, this essay made me think of writing in more authoritative way in any kind of essay and reading them give me ways to increase, to improve how my writing supposed to be (Ramos, 2012, p. 317).

Reflection Questions

1. Which genre would you focus on to build an instructional unit using the TLC? Why?
2. What knowledge about language would you need to make the academic language resources that function to realize meanings in this genre visible to learners?
3. As an educator, what steps can you take to deepen your understanding of SFL-based genre pedagogy?
4. How can genre pedagogy support ELLs in secondary classrooms in deepening content learning and strengthening academic language and literacy development simultaneously?

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Six High-Leverage Writing Practices for Teaching English Language Learners in English Language Arts

Julie Goldman

Abstract This chapter provides an overview of the Six High-leverage Writing Practices approach for teaching English language learners (ELL) in English language arts contexts. Through understanding, implementing, and reflecting on the research-based instructional practices discussed in this chapter, educators cultivate a shared understanding around quality ELL-relevant instructional practices and create more purposeful, coherent systems – in classrooms and across schools – to support ELLs to thrive academically. This approach links theory to practice and provides a structure for teachers to engage culturally and linguistically diverse students in a dynamic culture of thinking and meaning-making.

1 Introduction

Writing is a complex task that has been consistently connected to academic achievement (Brown, 2005; Bunch & Willett, 2013). Writing is seen as a key skill for students to be better prepared for the demands of higher education (Conley, 2005). In fact, writing has been regarded as the most important skill for students to be college ready (Conley, 2007). Little has changed in the decade since Conley (2005, 2007) made his plea for teachers to implement higher quality writing practices for middle and high school students. There is strong evidence that the gap between English language learners (ELLs) and fluent English speakers has widened (Bunch, Kiber, & Pimentel, 2012), primarily attributable to the limited preparation in writing instruction that teachers receive in teacher preparation programs (Dabach, 2015; Faltis & Valdés, 2016).

High schools have been graduating millions of students who lack the writing and thinking skills needed to be successful in today's global economy. For the 7000 high

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school students who drop out of school each day – including increasingly greater numbers of ELLs – the need to address the writing crisis in a systemic way is critical (Gándara & Contreras, 2009; Graham & Perin, 2007; Snow & Biancarosa, 2003). ELLs are four times more likely to drop out of high school and significantly less likely to go to college, even after controlling for relevant demographic variables (Fry, 2008), and a growing portion of the 5 million ELLs in U.S. schools struggle to acquire a sufficient level of academic writing skills necessary to be successful in school, college, and career (Calderón, 2012; Olsen 2010). Disaggregated data reveal that a disproportionate representation of ELLs do not enroll in college courses or achieve proficiency in writing and math to complete high school or college work (Flores, Batalova, & Fox, 2012). Literacy acquisition is particularly challenging for ELLs who are still in the process of acquiring the academic language needed to analyze and create complex text (Bunch et al., 2012; Wong Fillmore & Fillmore, 2012).

Teachers need the knowledge and skills to provide students with rigorous literacy instruction and address the chronic opportunity gap between ELLs and their fluent-English-speaking peers in both language and content classes (Fang, 2005; Gándara & Rumberger, 2009; Santos, Darling-Hammond, & Cheuk, 2012; van Lier & Walqui, 2012). The increased emphasis on proficiency in academic writing across the curriculum in the new standards further highlights the need for practical approaches to writing that support teachers to implement best practices in secondary classrooms (Bitchner, Young, & Cameron, 2005; Ferris, 2004; Santos et al., 2012; van Lier & Walqui, 2012).

The rationale for this chapter is founded on several key issues. First, writing is an essential skill that secondary ELLs need to develop in order to achieve academically and access professional opportunities. Second, teachers need specialized skills and knowledge to provide second language writing to secondary ELLs. Among researchers in the field of language acquisition, there is widespread agreement that well-prepared teachers are the single most important factor in student achievement. Third, research studies that address second language adolescent writing remain scarce – even with the recent national spotlight on the importance of teaching literacy across the content areas (Coady, Harper, & de Jong, 2015; Gilliland, 2015; Leki, Cumming, & Silva, 2008). By understanding the research-based instructional practices discussed in this chapter, educators can create more purposeful, coherent systems – in classrooms and across schools – to support culturally and linguistically diverse students to succeed academically.

2 Approach to Teaching English Language Arts to ELLs: Six High-Leverage Writing Practices

Educational organizations have developed an array of resources to support teachers' implementation of writing instruction, but few provide direct guidance for ELL-relevant instruction that foster a shared understanding around quality ELL-relevant instructional practices (ASCD, 2013; Council of the Great City Schools, CGCS, 2013; Editorial Projects in Education Research Center, 2013; Stanford University,

2013; TESOL International Association, 2013). Even fewer have specifically addressed the expectations surrounding written language, including its integration with content areas, and how to best structure writing instruction to support ELL students' access to rigorous language demands. According to Fink and Markholt (2011),

> We know from experience that there is not a widely shared view of what constitutes quality instruction – not among teachers, principals, or school district leaders…Without a shared understanding of what we mean by quality instruction, we have no basis from which to mount an improvement effort. (p. 5)

For decades, both language and content teachers have assigned writing prompts in which students brainstorm, organize, draft, revise, edit, and publish; the emphasis has largely been on the drafting process, often with little pre-writing activity. In a traditional instructional model common in English language arts (ELA) practice, the writing prompts are too frequently extensions to the reading tasks. A more robust approach to writing instruction is needed – one that flips and expands this traditional paradigm by focusing on the writing product and designing instruction to provide students with opportunities to experience the writing genre through guided, collaborative, and individual practice. Through this fundamental shift in practice, educators can better engage secondary ELLs in dynamic, meaningful experiences on a wide range of academic and literacy skills, namely the critical thinking and literacy skills that nurture independent writers to comprehend challenging content-area texts, value evidence, understand and critique different points of view, and use digital media to produce high-quality writing products (California Department of Education, 2013).

The approach to writing discussed in this chapter creates a context for teachers to cultivate a shared understanding around quality writing instruction and build teachers' capacity to implement more effective writing practices for ELLs across content areas. Defining academic literacy to include the cognitive and tangible skills involved in reading, writing, and academic oral language, this approach draws on key high-leverage writing practices for secondary ELLs (Goldman, 2013): (1) teach genre writing; (2) model writing for and with students; (3) build on students' backgrounds; (4) develop oral academic language; (5) teach grammar and vocabulary explicitly and in context; and (6) publish (and celebrate!) writing using technology (August & Shanahan, 2006; Genesee, Lindholm-Leary, Saunders, & Christian, 2005; Short & Fitzsimmons, 2007). This approach is grounded in a current understanding of research-based best practices and builds on expertise within both research and practitioner contexts. The practices provide secondary teachers of ELLs a context to create a systemic, schoolwide writing approach that supports the culturally and linguistically diverse needs of language learners.

2.1 Practice 1. Teach Genre Writing

Practice 1 provides the instructional frame for teachers and administrators to develop a shared understanding of what high-quality writing instruction looks like. The other five high-leverage practices are nested within this first practice (see Fig. 1). In Practice 1, teachers use writing and modes of thinking (describing,

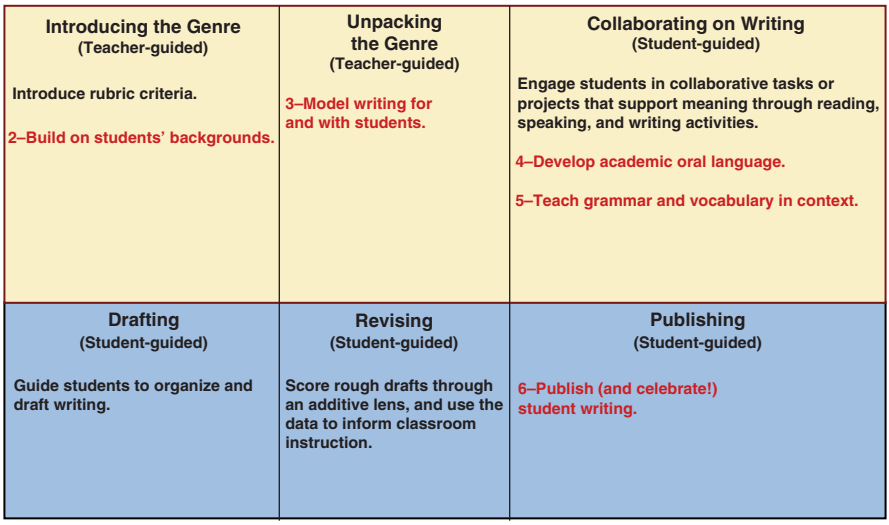

Fig. 1 The six high-leverage practices approach

summarizing, comparing, contrasting, narrating, evaluating, analyzing, persuading, problem solving, and researching) to analyze rubric criteria, understand the learning goals, foster student autonomy, connect the new learning (content or genre) to students' backgrounds, and explore the deep structure of language through teacher-modeled writing, strategic annotation, and explicit grammar and vocabulary instruction within the context of a students' own reading and writing. Throughout this detailed, recursive, process – introducing the genre and rubric criteria, unpacking or modeling the genre, and collaborating on writing, drafting, revising, and publishing – teachers simultaneously deconstruct the modes of thinking and disciplinary language involved in a specific writing product. In a secondary ELA context, practice 1 amplifies the pre-writing process through the first three phases (top row) and builds on students' writing strengths during the second three phases (bottom row):

Introducing the Genre During this phase, teachers provide a clear vision of what the final writing product(s) might look like. Teachers introduce an analytic rubric that includes specific, observable data or learning criteria (i.e., the author identifies the title, the author, and the main idea) and facilitate opportunities for students to make meaningful connections to the genre or content.

Unpacking the Genre This phase involves modeling the thinking, language, text organization, and grammatical structures for the writing product or task (see Practice 3).

Collaborating on Writing This multi-faceted phase involves facilitating collaborative tasks and projects in the modes of thinking (describing, summarizing, comparing, contrasting, narrating, evaluating, analyzing, persuading, problem solving, and researching) to engage students in collaborative, academic discussions and writing

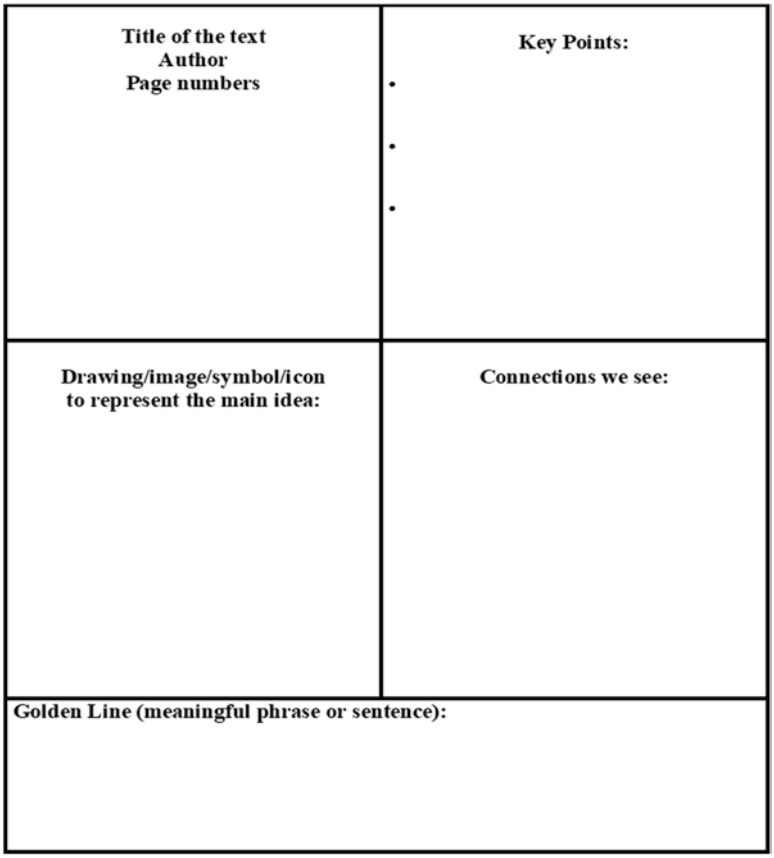

Fig. 2 Sample summary poster template

around relevant, complex texts. When students experience multiple interactions with a broad range of texts, including books, articles, videos, and artwork, they deepen their understanding of the writing genre. Practice 4, develop academic oral language, and practice 5, teach grammar and vocabulary explicitly and in context, are implemented comprehensively in this phase of the writing process. Any number of collaborative activities can be leveraged to foster deeper learning around collaborative writing tasks, including reciprocal teaching, a summary poster, expert group jigsaws, a gist summary (who, what, where, when, why, and how), Socratic seminars, and problem/solution community projects (see Fig. 2).

Drafting, Revising, and Publishing By the time students begin to draft, revise and publish their individual writing pieces, they have already experienced the writing process in a multi-layered manner that builds academic literacy and content knowledge in tandem. Teachers then guide students to read and interpret the prompt (similar to the pre-writing prompt) and to organize and draft their writing piece. During

the revising phase, teachers score students' rough drafts, and use the data to inform their instruction. They also utilize student-led conferences to build student autonomy and understanding of the genre criteria, provide students with strengths-based feedback, and guide students to self- and peer-edit. Finally, teachers provide students with opportunities to publish, celebrate, and make their writing "public" in some way (i.e., digital forum, letter to the editor or organization).

The instructional frame for Practice 1 is based on the research that acknowledges the interconnected nature of genre and process writing approaches to support students in writing academic and workplace texts (Hyland, 2004; Tribble, 1996). Process writing refers to planning, organizing, editing, and setting goals (Hayes & Flower, 1980; Krapels, 1990), while genre writing refers to abstract, socially recognized ways of using language, such as telling a story or persuading someone to take an action (Hyland, 2004). As students learn the language and conventions for a particular genre, they develop as autonomous, versatile writers who can transfer their writing skills for multiple purposes (Hyland, 2004; Johns, 2008; Smolkin & Donovan, 2004). Hyland made a clear case for genre: genre is "explicit, systematic, needs-based, supportive, empowering, critical and conscious raising" (p. 21). Furthermore, genre writing facilitates the learning of language: "Genre analysis, the study of how different kinds of writing are organized and presented for a reader, has been found to help both native speakers and ESL students read and write more effectively" (Reid, 2011, p. 42) and clarifies the patterns language by building on natural genre awareness that children in all literate societies acquire from their environment (Christie & Martin, 1997; de Oliveira & Iddings, 2014). Genre writing instruction also fosters reflective teachers who reflect on their own writing in service of helping their students understand and deconstruct challenging texts.

> For writing teachers, genre pedagogies promise very real benefits. The concept of genre enables teachers to look beyond content, composing processes, and textural forms to see writing as an attempt to communicate with readers – to better understand the ways that language patterns are used to accomplish coherent, purposeful prose. (Hyland, 2004, p. 5)

Practice 1, *teach genre writing,* also addresses a common criticism of the process approach to writing instruction: that feedback on writing pieces typically occurs only during the revising phase of the writing process (Cummings, 2015; Polio, 2003). During the amplified pre-writing process described in practice 1, teachers provide ongoing, purposeful feedback as they model the writing for and with students and engage students in collaborative writing tasks and projects.

2.2 Practice 2: Build on Students' Backgrounds

The second practice highlights the importance of addressing the needs of culturally and linguistically diverse students: who they are, where they are from, what they already know, and what is important to them. When teachers and administrators better understand the diverse communities of ELLs, their instructional and linguistic

needs, and the reality and range of ELLs' educational experiences, educators can better identify learners' strengths and needs, plan lessons together, and create a climate where a range of voices engage in meaningful conversations around meeting the varied needs of their ELLs (Dolby, 2012). When teachers build on students' backgrounds throughout the instructional process, they build student agency and voice by intentionally designing experiences for students to make meaningful connections to the genre or content during the pre-writing process.

An established body of research indicates that writing teachers can strengthen ELLs' cognitive skills by encouraging students to develop their independent voices, share their personal perspectives, affirm their values, and view their parents, family, and neighbors as valuable sources of knowledge (Ada, 1993; Fullan, 2003; Nieto, 2000; Walqui, 2010). These contextualized personal connections can serve as anchors for learning as students write to explore and think critically about family, school, community and global issues (Ada, 1993; Nieto, 2000; Olsen, 2010; Walqui, 2010). When ELLs receive instruction that values their home cultures, backgrounds, and primary languages, it prepares them for the complex task of writing. By finding a *voice*, students engage in meaningful personal connections, which serve as anchors for new learning (Cummins, 1989; Fullan, 2001).

Deeply rooted in culturally responsive pedagogy – defined by Gay (2002) as "using the cultural knowledge, prior experiences, frames of reference, and performance styles of ethnically diverse students to make learning more relevant and effective for them" – this practice promotes student connectedness with schools, decreases behavior problems, and advances learning (Kalyanpur, 2003). By appreciating and being sensitive to a child's background and educational experiences, educators increase their individual and collective understanding of who their ELLs are – including their previous schooling, home language, and literacy experiences – in order to identify and remove the greatest barriers for learning (Hammond, 2018; Osher, Cartledge, Oswald, Artiles, & Coutinho, 2004). By valuing students' experiences, languages, and cultures, educators maximize new learning and make new learning relevant and meaningful (Banks, 2008; Delpit, 2005; Gay, 2000; Hammond, 2018; Nieto, 2000).

2.3 Practice 3: Model Writing for and with Students

Practice 3 emphasizes the need for teachers to share their thinking around how they deconstruct a text, organize their writing, vary language and syntax, and demystify the writing process as they make their thinking visible to students. Of all the high-leverage practices, this one has the greatest impact – and it is also the most challenging for teachers to do (Haas, Goldman, & Faltis, 2018). Modeling the metacognitive process involved in writing initiates discussions, reinforces content, promotes inquiry, fosters new learning, and encourages reflection (Goldberg, Russell, & Cook, 2003). Not only does modeling the writing process support secondary ELLs in understanding the organization and structure the writing product, but it also

creates a space for the class to collectively reason and analyze how to write a text. Kelly Gallagher (2011) explains why modeling writing is the most powerful writing strategy:

> The teacher should model by writing – and think out loud while writing – in front of the class. When my students see me wrestling with decisions as my writing unfolds, it gives them insight on how to compose their own pieces. I don't tell them how to draft their papers; I show them how I draft my papers. (p.15)

Modeling writing involves engaging students in language tasks with linguistic supports that promote both content and language learning simultaneously. For example, when a teacher models her thinking and decision-making around what a successful writing product looks like, students see evidence of the writing criteria, language to support the specific writing product, and structure or process for organizing the writing.

2.4 Practice 4: Develop Academic Oral Language

Practice 4 underscores the need to use language functions to scaffold academic language, scaffold writing, and most importantly, scaffold student thinking. Too frequently, secondary ELLs have limited opportunities to speak in general or with other students (Soto, 2012). For this reason, researchers and language experts promote the use of instructional strategies that support daily academic oral language practice, including repeated presentation of content, explicit explanations, modeling and questioning (Garner & Bochna, 2004). Academic oral language practice involves engaging with the specific language functions needed to summarize, synthesize, compare, contrast, describe, evaluate, analyze, persuade, propose, narrate, research, and problem-solve (Zwiers, 2014).

Secondary ELLs need to experience how the specific language functions work – and they need meaningful tasks that foster authentic academic talk (Bartolomé, 1998; Delpit, 2005). When students engage in frequent language input and output where they practice thinking and speaking like a literary critic, scientist, mathematician, or historian, the apply language skills that build into and from the content disciplines.

Learning to speak is an incredibly complex process – and a large body of research indicates that reading comprehension, including cross-language reading comprehension, and oral language development correlate closely. Oral language practice not only facilitates reading comprehension within languages, but it also transfers across languages (Miller & Johnson, 2004; Proctor, Carlo, August, & Snow, 2005). Academic oral language is widely accepted as the foundation on which all literacy skills develop and how students learn to construct meaning through responding to and interacting with a broad range of texts (August & Shanahan, 2006; Snow, Burns, & Griffin, 1998).

2.5 Practice 5: Teach Vocabulary and Grammar Explicitly and in Context

Practice 5 emphasizes need to teach grammar and vocabulary explicitly – both in the context of academic reading and within the context of the students' own writing. Research supports that ELLs also need an organization for acquiring focused, high-frequency, academic vocabulary; something as simple as keeping a vocabulary notebook – schoolwide, that is – is one of the most effective and efficient techniques for acquiring new vocabulary (Olsen, 2010; Reid, 2011; Valdés, 2001). The intensive teaching of vocabulary in context in the ELA writing classroom is a critical skill linked to reading comprehension and academic oral language proficiency for ELLs (Alidou & Kelch, 2007; August & Shanahan, 2006; Biber, 1989; Ferris, 1994; Genesse et al., 2005; Santos, 1988; Short & Fitzsimmons, 2007).

While the topic of grammar instruction for ELLs continues to be an area of disagreement among researchers, there has been a general shift in thinking in the two decades to support the idea that both indirect and direct grammar instruction, including word groups and sentence structure, helps secondary writers understand the structure of the language (Delpit, 2005; Ferris, 2004; Olsen, 2010; Panofsky et al., 2005; Reid, 2011). Researchers point out that this balanced approach to grammar instruction should begin when students are at lower levels of language proficiency and might not be ready to self-edit (Panofsky et al., 2005).

An important area of grammar instruction is feedback, and over the past few decades, prominent researchers have debated this topic intensely in the literature, (Ferris, 1994, 2004; Truscott, 1999). Today researchers largely agree that "indirect feedback is more effective than direct feedback in helping learners improve the accuracy of their writing" (Bitchner et al., 2005). While direct feedback refers to the teacher-generated comments or scores, indirect feedback includes the tasks and experiences that engage students in problem-solving as they self-edit (Ferris, 2004). Rather than spending long hours editing every error in their students' work, the research behind Practice 5 indicates the need for teachers to orchestrate focused mini-lessons on key grammar points and practice editing strategies. (Ferris, 2004).

2.6 Practice 6: Publish Writing

Practice 6 focuses on the importance of publishing and celebrating student work and authorship through both low-tech (student-created books, classroom or school walls, poster presentations) and high-tech publishing platforms (blogs, online classrooms, digital presentations). For example, research shows that writing portfolios help students understand, evaluate, and reflect on their language goals (Hall & Simeral, 2008). Studies also show that students who use technology to write, write more, produce high quality writing, make more changes, collaborate more, question more, and use a more complex process (Goldberg et al., 2003). As discussed in

Practice 1, teachers begin the instructional process with a clear vision of published writing product in order to create tasks and experiences with intentional linguistic supports that guide students toward writing proficiency (Leki et al., 2008).

3 Theoretical Foundations of the Approach

This approach does not include a singular theoretical foundation; rather, the theoretical underpinnings that inform this approach are part of a hybrid conceptual framework for adolescent second language writing informed by genre-based writing, sociocultural theory, as well as the organizational, meta-cognitive, and writing process elements of the cognitive orientation discussed in the previous section of this article. At its core, however, this framework centers on the ideological viewpoints shared by a small, often unconventional, group of social justice researcher-practitioners within the field of second language writing who acknowledge the inherent ideological connections between culture and politics in teaching ELLs (Alfaro & Hernandez, 2016; Benesch, 1993, 1995, 1996; Canagarajah, 2012; McKay, 1993; Pennycook, 1994, 1997, 1999), and who continually question the scope of the role of the second language writing teacher (Johns, 1995; Santos, 2001).

The social justice lens "is a way of thinking about negotiating and transforming the relationship among classroom teaching, the production of knowledge, the institutional structures of the school, and the social and material relations of the wider community, society, and nation state" (McLaren, 1998 p. 45). Based on a fundamental belief that learning stems from change, this lens compels learners to thoughtfully examine their current realities, imagine and act on the possibilities they desire, and strive to make a difference in the world (Wink, 2000). Gándara and Contreras (2009) explain this point:

> Critically, teachers must know how to provide deep, rich, and intellectually challenging instruction that pushes students to excel…They must be able to help children learn to think deeply and creatively about problems and they must be able to build on the foundations of learning that students bring with them to the school. (p. 320)

The most prominent voice in social justice pedagogy is the late Brazilian educator, Paulo Freire (1921–1997). According to Freire (1970),

> education either … is used to facilitate integration of the younger generation into the logic of the present system and bring about conformity, or it becomes the practice of freedom, the means by which men and women deal critically and creatively with reality and discover how to participate in the transformation of their world. (p. 34)

In essence, social justice pedagogies challenge students to understand and question: How does *X* change our lives? Who will benefit? Who will be the advantaged? (Luke, 2000). From a wide-angle lens, this perspective includes three phases: to name, to reflect, and to act (Wink, 2000).

For teachers of second language writing, social justice pedagogy enriches the writing process, promotes analytical thinking skills, and develops student leaders. This hybrid theoretical framework provides a structure for teachers to explore issues

of equity and access, question, negotiate, and transform instruction for ELLs in ELA classrooms.

4 Implementation of the Approach

The **San Diego County Office of Education's** Writing Redesigned for Innovative Teaching and Equity (WRITE) Institute applies this approach with educators throughout California. For nearly three decades, WRITE has prepared teachers to address the specific needs of ELLs. Recently, WRITE showed documented evidence of promise in an Institute of Educational Sciences (IES) Goal 3 evaluation (Haas et al., 2016). Currently, WRITE's network serves over 60 school districts, 1200 language and content teachers, and 36,000 students in 12 demographically diverse California counties. When teachers have the time to design and plan meaningful opportunities for their students to produce complex, sophisticated writing, they maximize learning outcomes for their students. Through blended professional learning contexts (in person and online), teachers learn together and develop the expertise to teach genre writing as a process, build on students' backgrounds, model writing, develop academic oral language, grammar, and vocabulary, celebrate student writing. A very effective way to create expert teachers is to have teachers experience professional learning around the writing practices themselves, "because that is how we change – by experiencing something new that is successful in all its complexity" (Haas, Fischman, & Brewer, 2014).

4.1 Get to Know ELLs

If the overarching goal of high-quality writing instruction is to improve learning outcomes for ELLs, increase students' abilities to tackle challenging content, and create a culture that nurtures the capacities of broadly literate, college-and-career-ready students, then educators need to better understand diverse communities of ELLs, many of whom have been marginalized in schools and society (Dolby, 2012). Through collecting, studying, and analyzing the quantitative data, such as students' language proficiency levels (ideally, both in students' primary languages, as well as in English), years in school, and language proficiency scores, teachers build empathy for their students' linguistic and learning needs and can better design learning experiences that will meet the language needs of ELLs. While these numbers are indispensable components for setting accurate language targets and monitoring student growth, understanding ELL students involves gathering individualized, qualitative data too. By gathering information about students' backgrounds and cultures, including identifying their home or heritage languages, teachers learn valuable information regarding student' linguistic experiences, passions and interests, strengths as learners, and specific academic needs. It is also helpful to ask relevant questions (i.e., What language experiences have shaped you most?), observe, and

listen. Teachers can collect illuminating information about ELLs strengths and needs through icebreaker activities, journals, presentations, home visits, and interviews (Gottlieb, 2016).

4.2 Ground Planning in Values, an Instructional Framework, and an Improvement Lens

When educators ground their practice in values (e.g., the values outlined in California's new ELA/ELD Framework) and a solid, global instructional framework (e.g., Multi-tiered System of Support (MTSS), Center for Educational Leadership, University of Washington, 5 Dimensions of Teaching and Learning), they have the tools to purposefully plan to meet the needs of their language learners. By focusing on continuous improvement cycle – plan, do, study, act – teachers make intentional pedagogical choices aligned to their students' strengths and needs. Likewise, they engage in a collective and individual reflective practice: Have my students met the criteria for this genre? Are there students who need additional practice? What kinds of experiences will best support their learning? What adaptations do I need to make to my instruction the next time I teach this unit?

4.3 Align Prior Professional Learning to the Practices

In order to connect teachers' prior professional learning to the writing practices, teams of teachers first take an inventory of the needs of their students and what they have already learned and implemented around integrated literacy (reading, writing, speaking, and listening) instruction (see Fig. 3). By engaging in this exploratory process, teachers see how their familiar practices and resources map on to and align with the high-leverage practices. In doing so, teachers also notice where the gaps or misalignments occur in their current individual or collective practice.

4.4 Gather Baseline Data and Begin Instruction

Prior to beginning instruction, teachers administer a pre-writing prompt and gather baseline data to identify students' specific linguistic needs and design instruction to intentionally meet those needs. Depending on the content, genre, linguistic needs of the students, and complexity of the collaborative writing tasks or projects, the time needed to implement this approach in a secondary ELA context typically ranges between 3–6 weeks. The following guiding questions provide the foundation for teachers to plan and implement this approach to writing for ELLs in an ELA classroom:

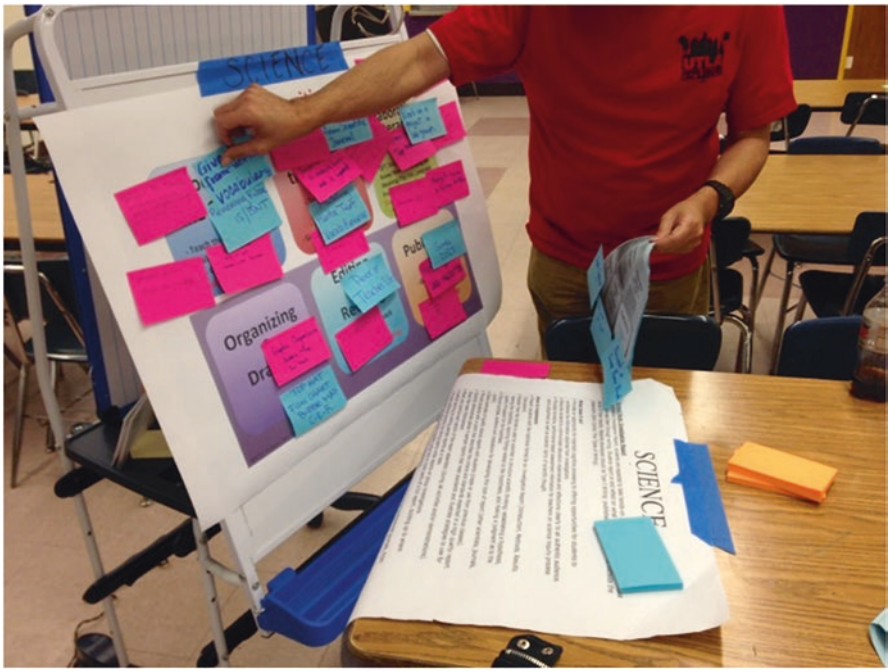

Fig. 3 Implementing the approach

4.5 Practice 1: Teach Genre Writing

Introducing the Genre Guiding Questions: What do I want my students to know and be able to do at the end of the writing process? What is the final writing product I want my students to know how to produce and what experiences will I create for them to access this type of writing? What kinds of texts (written, video, art, photos, etc.) and what range of perspectives will I provide for my students to summarize, synthesize, compare, contrast, etc.? How will I set up the class portfolios and daily formative assessments? Also see the Guiding Questions for Practice 2.

Unpacking the Genre See the Guiding Questions for Practice 3.

Collaborating on Writing What kinds of collaborative tasks and projects engage students in collaborative, academic discussions and writing around relevant, complex texts? What kinds of texts (articles, books, videos, art, graphs, charts) do I want my students to interpret? See the Guiding Questions for Practice 5.

Drafting Guiding Questions: How will I provide similar conditions to those during the baseline assessment? What time limits (if any) will I provide?

Revising Guiding Questions: When scoring student work, take an additive approach: ask what *can* this student do? For example, notice the student's writing

strengths before focusing on areas for improvement. During a conference, ask students: What do you think you did well? Which criterion do you think you need to improve? Which criteria would you like my feedback on?

Publishing See Practice 6.

4.6 Practice 2: Build on Students' Backgrounds

Guiding Questions: What are you already doing to connect new learning to students' backgrounds? What are you doing to teach the rubric criteria? What are your next steps to plan and build on students' backgrounds and teach the rubric criteria? How can I connect this new learning to my students' identities and cultures? What kind of prompt and text will I use for the pre- and post-assessment?

4.7 Practice 3: Model Writing for and with Students

Guiding Questions: What kind(s) of writing do I want my student to produce? What should the structure or organization of the writing look like? What language do they need to support this genre? What domain-specific language do they need?

4.8 Practice 4: Develop Academic Oral Language

Guiding Questions: What is the thinking and the language I want my students to engage with and acquire? How will I organize classroom learning to develop academic oral language? What relevant, high-quality texts will we read? What kinds of collaborative tasks and group discussions will I facilitate? What kinds of opportunities will students have to express diverse points of view? What kinds of language supports – including partially composed statements and question swill I use to provide structure for academic thinking, speaking, and writing?

4.9 Practice 5: Teach Grammar and Vocabulary Explicitly and in Context

Guiding Questions: What kinds of texts and perspectives will I choose? How will I encourage my students to think critically about the text(s)? What are the specific linguistic supports students need to recount what happened, explain how to do

something, describe an observation, or argue, justify, or interpret with reasoning and evidence? What opportunities will students have to explore word transformations and engage in noticing language structures?

4.10 Practice 6: Publish (and Celebrate!) Student Writing

Guiding Questions: How will we share our writing to make it "public" (i.e., in class, at school, in the community, etc.)? How will I celebrate my students' writing? What kinds of digital forums might support publication? How will we keep writing portfolios (low-tech or high-tech) to develop students' language over time, inspire creativity, and promote student responsibility?

5 Conclusion

While some middle and high school teachers share writing instructional practices that include portfolios and projects, far more frequently, secondary teachers describe practices limited to assigning and grading writing. To shift from assigning writing to teaching writing, teachers need to know what to focus on and how to structure their instructional practice. The high-leverage practices help classroom teachers design better opportunities for students to interact with texts (reading, speaking, and writing) in meaningful ways. When teachers tap into students' prior knowledge, affirm their identities and cultures, and build language and content together, they leverage writing instruction and facilitate experiences where students can develop their own unique voices to the fullest potential. Likewise, when teachers engage students in continual meaning-making throughout the writing process, students understand the relevancy of the writing tasks to their own lives. As teachers individually and collectively nurture independent writers to comprehend challenging content-area texts, value evidence, understand and critique different points of view, and use digital media to produce high-quality writing products, students learn to apply the critical thinking and literacy skills to express themselves effectively in writing. When educators center their instructional decisions in responses to students' needs, evaluate and align various professional learning resources, and design schoolwide literacy plans, they begin the complex process of engaging in a responsive approach to writing instruction.

Bottom line: every high school student deserves the opportunity graduate with the writing skills needed for success in our global economy. For this reason, achieving quality learning is "the equity and social justice issue of our time" (Fink & Markholt, 2011, p. xviii). To achieve this goal, secondary educators need to cultivate a schoolwide approach to writing instruction that simultaneously supports intentional and responsive instruction: (1) teach genre writing; (2) model writing for and with students; (3) build on students' backgrounds; (4) develop oral academic

language; (5) teach grammar and vocabulary explicitly and in context; and (6) publish (and celebrate!) writing. With its synergy of applied linguistic, sociocultural, cognitive and critical perspectives, the High-leverage Writing Practices approach lends itself to broad application across secondary contexts. The high-leverage writing practices link theory to practice and equip teams of educators with the tools to foster deep collaboration around language and literacy. Through engaging in professional dialogue and reflective practice around the research, teachers, instructional leaders, and administrators can create more coherent systems to support culturally and linguistically diverse students to thrive academically.

Reflective Questions

1. In what ways does your school or district address each of the six high-leverage writing practices?
2. What are some current professional learning efforts around writing for ELLs in your teaching context?
3. What data-driven sources do teachers draw from to inform their instructional practices around writing?
4. How does your school or district currently assess ELL progress toward meeting standards?
5. Reflecting on the practices, what might be a next step to strengthen your writing program at your site? How would you specifically address the needs of ELLs?

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Using Multicultural Nonfiction and Multimedia to Develop Intercultural Competence

Vicky Giouroukakis and Maureen Connolly

Abstract One of the competencies of the literate individual as outlined in the Common Core State Standards for English Language Arts (ELA) & Literacy is the ability for students to understand other perspectives and cultures and communicate effectively with diverse populations. The authors describe an approach used in the ELA classroom that combines multicultural nonfiction and multimedia to develop students' intercultural competence. This approach encompasses an extended learning experience involving *In Our Village*, a series of nonfiction texts about different cultures throughout the world. Students engage in various literacy activities and use multimedia to explore the concept of culture and represent their new understandings and experiences through the publication of their own book about their cultures. The approach is intended to help ELLs and native English speakers encounter multiple perspectives and ways of life that are different from their own and develop the ability to work and communicate effectively with peers of diverse backgrounds.

1 Introduction

One of the Competencies of the Literate Individual (CLI) as outlined in the Common Core State Standards for English Language Arts (ELA) & Literacy in History/Social Studies, Science, and Technical Subjects (National Governors Association Center for Best Practices & Council of Chief State School Officers [NGA & CCSSO], 2010a) is the ability for students to understand other perspectives and cultures and communicate effectively with diverse populations. This ability, commonly called

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intercultural competence, is an important life skill for all students—both English language learners (ELLs) and fluent English-speaking students —to develop because it is critical to the exercise of the rights and responsibilities of global citizens and to the navigation of everyday life. This skill is directly connected to students' reading comprehension and listening as well as to their ability to communicate via writing and speaking.

Young people entering college and the workforce in the twenty-first century are expected to collaborate on tasks, communicate effectively, and work well together to achieve set goals. In K-12 settings, students need to understand and cooperate with each other to learn content and skills. They need the ability to appraise perspectives that they may not necessarily share and to develop respect for different cultures. Primary and secondary education has seen positive results in terms of building cultural understanding through community and service learning projects and outreach programs that involve diverse communities outside the classroom (Wade, 2000). This approach is effective, but if students are *inside* a classroom that is diverse and represents various cultures, languages, and perspectives, what better environment in which to begin their practice of developing intercultural competence?

Unfortunately, in many content-area classrooms, English language learners (ELLs) are not given sufficient opportunities to learn about their peers or to develop their speaking skills. Too many times, we think just because ELLs represent different cultures that they already possess intercultural competence. However, this is an assumption that should not be made, especially in this ever-changing world where young people's diverse experiences and situations vary so much. Also, native-speaking students need to engage in meaningful activities that involve exploration and deep understanding of other cultures and perspectives. Research shows that many students lag behind in knowledge of cultures, world geography, and foreign languages (National Economic Association [NEA], 2010; Stewart, 2010).

The increasing diversity in today's world and the classroom, which is a microcosm of the global domain, necessitates an awareness and understanding of various cultures, languages, and perspectives in order to get along with people and promote productive and peaceful relations. In this highly connected age, today's technology facilitates relationship building as we interact with people all over the world via the Internet, Twitter, Facebook, Instagram, Skype, and other platforms. Using multicultural literature and multimedia within the classroom can help advance the communication skills of not only ELLs but also native English-speaking students. Focusing on nonfiction particularly supports an awareness of and respect for multiple perspectives, thus facilitating all students' development as global citizens.

2 Approach to Teaching English Language Arts to ELLs: Using Multicultural Nonfiction and Multimedia to Develop Intercultural Competence

In this chapter, we argue that the ELA classroom is the ideal environment to use an approach that combines multicultural nonfiction and multimedia to develop students' intercultural competence. We describe an extended learning experience involving *In Our Village*, a series of nonfiction picture books developed by youth to represent the cultures of people throughout the world. Barbara Cervone developed the first In Our Village book when she was visiting her son in Tanzania. There, she met a group of children who were asking for help, and she decided she would help them share their story. She provided the children with digital cameras and challenged them to photograph their village and describe what it is like to live there. The students took on the task with vigor. Cervone compiled their photos and descriptions of their lives into the first *In Our Village* book. This book has since sold over 5000 copies. Proceeds from the sales have helped to fund scholarships for youth in the village as well as upgrades to health facilities. In addition, the students have also built a school library that includes not only their book, but also books created by youth ages 5–22 from all over the world. Over 60 electronic versions of these picture books representing countries on five different continents can be found on the inourvillage.org website. In addition to posting online, authors of these texts are asked to mail a copy to the original *In Our Village* school in Tanzania (see website http://www.inourvillage.org/).

Through exploration of these multicultural texts, students gain new knowledge that expands their cultural understanding and sensitivity. Then, they utilize technology to represent their new understandings through the publication of their own *In Our Village* book about their cultures. Their *In Our Village* book is then shared with an authentic audience on the *In Our Global Village* website, thus contributing to the collective knowledge of students who follow in their footsteps exploring culture through this website. Students write their book with an authentic audience in mind, thereby producing stronger and more genuine writing.

This approach is intended to help ELLs *and* native English speakers encounter multiple perspectives and ways of life that are different from their own through reading, writing, listening, and speaking, and to develop the ability to work and communicate effectively with peers of diverse backgrounds.

High-quality fiction and nonfiction books that represent students' languages and cultures, with authentic themes and diverse characters, ensure success because they affirm ELLs' languages and welcome their differences (Nemeth, 2015). Wartski (2005) makes a strong case for examining multicultural literature:

> Stereotypes, preconceptions, and distrust fade in the face of shared experience, and with these villains gone, friendships have a chance. Friendship bridges differences, and trust is a covenant. What simple concepts—and yet the message is hard to get across in a world where international conflicts rage like forest fires and where our own nation grapples with the profiling of minorities, discrimination in the workplace, and distrust between peoples.

> Yet in the classroom, students of many cultures are expected to sit down together in harmony! (p. 50)

The diversity represented in schools today offers a unique opportunity for students who bring different cultural experiences to develop intercultural competence that will serve them well not only in their K-12 and college experience, but in their careers and personal lives. Banks (2006) argued that "Diversity… provides schools, colleges and universities with an opportunity to educate students in an environment that reflects the reality of the nation and the world and to teach students from diverse groups how to get along and how to make decisions and take actions in the public interest" (p. 144). Cultural and linguistic diversity can be utilized as a resource, cultural capital that can enhance learning not only for ELLs but for all students in the classroom.

We should note that the term *culture,* as we are using it here, is an expansive one, meant to extend beyond the traditional definition of customs and mores that are rooted in national origin. "Historically, generalized categories of racial and ethnic identity have become more diffuse and complex. We are also more mindful of the often less visible forms of difference that are present in any learning environment, such as socioeconomic status, sexual orientation, religion, disability, and many others" (Lee, Poch, Shaw, & Williams, 2012, p. 1).

2.1 The Concept of Intercultural Competence

Intercultural competence is defined as "knowledge, beliefs, and skills that allow one to understand the point of view of someone from a group culturally or linguistically different from one's own and act or communicate effectively and appropriately" (Creeden, Kelly-Aguirre, & Visser, 2016, para. 2). A person who has intercultural competence possesses the ability to interact and communicate effectively with people from other cultures, understands and empathizes with others, values difference amongst people and cultures, and takes action when they see the need to do so.

These concepts seem well synthesized by the EdSteps Project, The Council of Chief State School Officers, and The Asia Society Partnership for Global Learning in their English Language Arts and Global Competency Matrix. This matrix includes the following four skills:

1. Students investigate the world beyond their immediate environment.
2. Students recognize their own and others' perspectives.
3. Students communicate their ideas effectively with diverse audiences.
4. Students translate their ideas and findings into appropriate actions to improve conditions (Boix Mansilla & Jackson, 2011).

These skills are important in today's society for native speaking students as well as ELLs as they need to learn to adapt to the diverse, multicultural environment of the classroom and environments outside of school. In addition, research tells us that "Repeated, deliberate engagement with diversity also contributes to the growth of higher order cognitive skills" (Lee et al., 2012, p. 3).

2.2 The Importance of Intercultural Competence in Education

According to NEA (2010), intercultural competence is a twenty-first century imperative in this increasingly interconnected and interdependent society. In the U.S., one in five jobs is tied to international trade. American society is consistently growing more linguistically and culturally diverse. Global challenges throughout the world are becoming more complex with increasing global health and environmental challenges. Therefore, intercultural competence is necessary for working with people from other cultures in order to problem solve and be productive. Most professions today require knowledge of other cultures and languages as well as cross cultural communication skills.

Another benefit is that intercultural competence enhances overall academic achievement as studying a foreign language has cognitive benefits and may enhance performance on standardized testing (NEA, 2010). Research shows that bilinguals and multilinguals are more advanced in terms of executive functioning and cognitive processing since they have to consider and make decisions as to which language they must use at what point and for what purpose (NEA, 2010). Intercultural competence has the potential of broadening students' perspectives, developing their ability to empathize, and engaging them in activity that can improve other people's lives.

In higher education, various programs afford students the opportunity to gain cultural sensibility by studying a foreign language and taking courses in areas such as international economics, political science, and business. Study abroad programs claim to generate an increased international awareness as well as self-awareness that contribute to personal growth (Dehmel, Li, & Sloane, 2011). On the middle and high school levels, service learning experiences have similar benefits (Warren, 2012; Yook, 2012).

2.3 Intercultural Competence in the ELA Classroom

The ELA classroom is the ideal setting where students can develop intercultural competence through content-based literacy activities. Students can read, write, listen, discuss, and present on social issues that unite them. Using multicultural literature and multimedia engages students in learning experiences about culture and community that involve self-exploration as well as an examination of diversity. Students take part in a series of steps that include scaffolded close reading, listening, and communication activities based on *In Our Village* books, multicultural texts that tell the stories of different communities all over the world. ELLs and native English-speaking students collaboratively write, digitally publish, and present their own book(s) to tell the story of their community.

This approach encompasses all four of the components of the English Language Arts and Global Competency Matrix. Students investigate the world beyond their immediate environment. By reflecting on their own definition of culture and com-

Table 1 Connections between ELA/global matrix skills and the In Our Village learning experience

ELA/global matrix skills	IOV learning experience
1. Students investigate the world beyond their immediate environment.	1. Students read *In Our Village* books.
2. Students recognize their own and others' perspectives.	2. Students reflect on their definition of culture and learn about their peers' definitions.
3. Students communicate their ideas effectively with diverse audiences.	3. Students verbally share what their reading taught them about other cultures.
	Students share, through discussion and writing, what they think is important about their own culture.
4. Students translate their ideas and findings into appropriate actions to improve conditions.	4. Students consider how to promote greater intercultural competence in their own community.

munity and bringing in evidence to support their ideas, *students recognize their own and others' perspectives*. By examining the sample *In Our Village* books, *students investigate the world beyond their immediate environment.* When they share what they learned about other cultures through their reading and what they think is important about their own culture through their discussion and writing, *students communicate their ideas effectively with diverse audiences.* Finally, when they consider how to promote greater intercultural competence in their own community, *students translate their ideas and findings into appropriate actions to improve conditions*. Table 1 represents the connections noted here.

3 Theoretical Foundations of the Approach

Below we outline the theoretical foundations of the approach, which include the use of multicultural literature in the ELA classroom, active citizenry, and sociocultural theory.

3.1 Multicultural Literature in the ELA Classroom

As our classrooms grow more and more diverse in terms of our broad definition of culture, it becomes imperative to include literature that broadens our students' view of their world. "Through multicultural literature, we can show that there is a great deal to be learned from people who have had different cultural experiences" (Wartski, 2005, p. 49).

Iwai (2015) outlines four benefits of exploring multicultural literature with students:

1. Broadens students' and teachers' perspectives
2. Decreases negative stereotypes
3. Increases awareness of diversity
4. Encourages investigation and appreciation of own culture

Each of the four benefits above is represented in the *In Our Village* Intercultural Competence Learning Experience. These benefits are particularly important for ELLs. By incorporating multicultural texts into the curriculum and thereby representing ELLs' diverse lived experiences, teachers give a voice to those students who may be culturally, linguistically, and academically marginalized.

Reading nonfiction also exposes students to diverse perspectives and prepares them for the demands of comprehending increasingly complex texts. The creators of the Common Core State Standards have called for the need for sustained exposure to expository text since it makes up the vast majority of the required reading in college and the workplace (Achieve, Inc., 2007). "What little expository reading students are asked to do is too often of the superficial variety that involves skimming and scanning for particular, discrete pieces of information; such reading is unlikely to prepare students for the cognitive demand of true understanding of complex text" (NGA & CCSSO, 2010a, p. 3). "Students need to read and comprehend informational texts as often—and as fluently—as they do narrative texts" (Goodwin & Miller, 2012, p. 80). Just as they need to be reading different authors and genres, they need to be writing for diverse audiences.

Esposito (2012) discusses the benefits of engaging students in writing for an authentic audience: "By allowing students to grapple with issues of place, community, and audience, we can better prepare them for the writing demands that lie ahead in college and thereafter" (p. 74). By incorporating multicultural nonfiction into their writing tasks, teachers can help students critically analyze global issues. This critical analysis leads to students taking action to better their world. According to Esposito (2012),

> writing for outside communities can sometimes mean writing in unfamiliar, yet navigable, territory. Writing with new technology for outside communities can sometimes mean writing in completely unknown terrain. Many of our students are unprepared to work outside the predetermined structures of school writing. That is why we need to present them with opportunities to write for numerous audiences and with newer technologies for a purpose. (p. 75)

3.2 Sociocultural Theory

Sociocultural theory of human learning describes learning as a social process, and that social interaction plays a role in the development of cognition (Vygotsky, 1978). Our pedagogical approach is based on the work of Lev Vygotsky because it emphasizes the social and collaborative nature of learning and language development. Teacher and students shape their concept of culture through various activities and modes of communication (verbal and writing). The approach views learning as occurring between individuals who are both taking active roles in interactions.

These interactions that are effective in terms of L2 development involve both teachers and learners as active participants in the co-construction of language and curriculum knowledge (Gibbons, 2003).

Vygotsky's (1978) concept of the zone of proximal development supports the idea of language development as a social process. He described this zone as the difference between the actual level of development attained individually and the potential level that can be reached through collaboration. Within the zone of proximal development, teachers need to guide students to develop language and higher cognitive functions. When students are given the opportunity to work in groups with their peers and lead the class, they develop these higher language functions (i.e., communicative competence) and mental functions (i.e., formation of concepts, attention, memory) and learn new information, concepts, and skills.

Bruner (1996) would agree with Vygotsky that students are active learners who construct their own knowledge and that teachers need to help students develop skills through the process of scaffolding (Wood, Bruner, & Ross, 1976). Scaffolding, like Vygotsky's zone of proximal development, "refers to the steps taken to reduce the degrees of freedom in carrying out some task so that the child can concentrate on the difficult skill she is in the process of acquiring" (Bruner, 1978, p. 19). This support system is provided by the teacher and/or the learners' peers. Gibbons (2015) argues that teachers' support and instructional choices contribute to the success of students. Providing scaffolding to ELLs is essential as they are faced with the challenge of not only learning content, as native speakers also need to do, but at the same time also developing their language skills.

Learning, however, can vary among cultures, and it is important to note that culture affects human development as well as the other way around. In our intercultural competence building approach, students engage in group activities that shed light on the concept of culture. Their definitions of culture are shaped through their interaction with their peers and the teacher. In the end, after several meaningful activities, students develop their own informed definitions of culture that affect how they view people from diverse cultural backgrounds.

The use of supporting materials and activities that are reflected in the intercultural competence building approach provide the necessary scaffolding for students to achieve the desired results: examine their perspectives of culture, communicate effectively, and translate their ideas into actions.

4 Implementation of the Approach

To begin the learning experience in our use of multicultural literature and multimedia approach to intercultural competence, students were asked to define *culture*. As we stated above, the concept of culture has evolved over time, so students shared ideas that did not fit with our personal definition of the term. We tried to remain open-minded as we kept in mind the fact that we were modeling how to seek to understand multiple perspectives.

We discussed how our shared culture is influenced by combining various cultures from around the world. Did students see evidence of blending of cultures within their community? We challenged students to become more aware of indicators of such blending. For instance, did they see signs written in more than one language? Were there stores or restaurants that specialized in food from different countries?

Students also considered how their community uniquely blended aspects of their individual cultures. Did they see "safe space" signs on store windows? Did the local library advertise for school productions or events? To help make this clear, some students opted to draw or photograph evidence that showed this blending of cultures. This documenting and sharing is an important component of the learning experience because it reminded ELLs and native speakers that all students have unique cultures that weave together to form a community. This evoked both comfort and empathy among the students.

We moved from the discussion and representation of culture to the development of another class definition—this time, students considered the concept of *community*. They worked together in groups to create a collage that combined their drawings and photos to represent their concept of community. We guided students toward representing big ideas about community, the unique aspects of their community, and the way that their community blended elements of various cultures.

It was important to take time to come to an agreement on the meaning of foundational terms like *culture* and *community*. This supported a strong understanding of the terms for ELLs and challenged native speakers to think more deeply about these concepts. Of course, we recognized that "In the 'Global Education Terminology Debate' definitions [of culture] abound and there are few agreements" (Taylor, 2013, p. 67). Sharing this with students allowed them some comfort in their confusion or conflict in grappling with these terms.

Once we focused on these important concepts, we invited students to branch out and learn about other communities by reading multicultural texts on the website: *In Our Global Village* (In Our Village, 2017). We particularly like this website because it publishes students' writing. A range of cultures and communities are represented, and the level of reading difficulty varies from text to text, so there is something for every reader. Therefore, these texts are rich in content, culture, language, and variety and are suitable for practicing the skill of intercultural competence. In order to promote a more thoughtful engagement with the texts, students used the Strategy of Pause, Write, Compel (discussed in more detail in the following sections).

Based on what they read from these models and their thinking about their own community, students worked together to write chapters in their own class *In Our Village* book, representing their shared community and the communities from which they came. Students made suggestions for how to promote greater intercultural competence within their community. For instance, some students wanted to write chapters through the eyes of Portuguese-American Youth or Greek-American Youth, or LGBT Youth.

Students engaged in the collaborative café activity in which they read and shared sample chapters from one *In Our Village* book and then created a visual representation of these stories (discussed in more detail in the following sections). They used

writing frames to write their own *In Our Village* stories. Lastly, students published their individual chapters and presented them in class.

An important component of this learning experience was the collaboration and sharing of diverse ideas. Students took pride in their heritage, values, and belief systems while learning more about each other. According to Lee et al. (2012):

> Recognizing and engaging all forms of difference may not be possible, but bringing multiple forms of difference into the center of the classroom space may facilitate awareness of how certain aspects of identity and lived experience are positioned by dominant discourses and their influence on concepts and beliefs about what is 'normal' whether in relation to knowledge, communication, or interactions. (p. 7)

In addition, helping ELLs make connections between what they are learning in school and their funds of knowledge about home and community literacies can help them view this knowledge as resources for building academic literacy (Gonzalez, Moll, & Amanti, 2005). We framed the activities around the ELA/Global Matrix Skills and provide more detailed descriptions in the following sections.

4.1 Students Recognized Their Own and Others' Perspectives

To help students *recognize their own perspectives* regarding culture and community, we engaged them in a **brainstorming** session around these concepts.

ELLs were able to brainstorm several ideas of what constitutes culture and demonstrated that they had a clear conception of their culture. For example, a student from Mexico discussed some of the norms and traditions that characterize Mexican culture, whereas some American students whose ancestors were born in the US felt that they had no culture and had poor conceptions of what exactly defined American culture since to be an American can mean different things. We asked them how a piece of clothing or jewelry that they were wearing represented their culture. We prompted them to articulate their ways of behaving and thinking, such as their beliefs, values, religion, traditions and guided them to recognize that, even though there is a shared American culture, there is also a more narrowly defined culture that they share with a smaller group of people.

We asked students how their classroom setup reflected the class or school community. Another option was to challenge students to analyze different definitions of culture or community and then to synthesize the key words or phrases from these definitions along with new words and phrases of their own in order to create a class definition. Had this proven difficult to do as a full class, we would have formed groups of 3–4 students to process together and then merge the groups' ideas into a full class definition.

Students engaged in **visual representations** of culture through photos and drawings which was an important element in this learning experience for ELLs. The saying, "a picture is worth a thousand words" truly fits here. Where ELLs struggled for language to describe their thinking, the picture provided support. Students

thought deeply about which pictures to use that would best highlight and communicate their culture and also evoke an emotional response. For example, students shared photos of their homes, platters of food setup for a party, friends hugging after a soccer game, grandparents holding babies, and more. Students, indeed, had emotional reactions to these photos. (That is why apps like Snapchat and Instagram are so popular.) They enjoyed this process and engaged in a more mindful viewing of their environment because of it.

The blending of photos to represent community parallels provided a strong visual metaphor for the blending of students' ideas and the blending of cultures that this learning experience was meant to highlight. Some students used a more tactile approach by cutting and pasting hard copies of their photos/drawings. Others opted for a more technology-based approach by using Photo Story or photocollage.com.

Once students formed their definitions of culture and community, we reminded them that these definitions were likely to evolve. That is what happens as we learn. We kept on checking in with students to see if there had been any affirmations of the definitions or if any of the definitions needed enhancing based on the discussions and reflections that took place.

4.2 Students Investigated the World Beyond Their Immediate Environment.

After focusing on their own experiences and perceptions regarding culture and community, it was time for students to *investigate the world beyond their immediate environment.* The Introduction at the *In Our Global Village* website is an excellent resource for this kind of investigation. We made sure to share the story of how *In Our Global Village* began. This is summarized in the "Introduction" section. Barbara Cervone visited with students in Tanzania and learned that they did not have any books in their school. To help them support themselves, she worked with the students to write the story of their village. She took the photographs and stories that they shared and compiled them into the first ever In *Our Village* nonfiction book—*In Our Village Kambi ya Simba through the Eyes of Its Youth*. Students could view this first book through a hyperlink on the website. They could also view videos of the students in Tanzania who wrote the book.

Once students explored the original *In Our Village* book, it was time for them to investigate additional cultures and communities. Students worked in groups to examine an *In Our Village* book of their choosing. To encourage close reading, students used the **Pause, Write, Compel strategy** which is a strategy that can be used throughout the reading process to make reading more manageable. Each student read a different chapter and, in the process, read a portion of the text, *paused*, *wrote* in the margins, and then reflected on what was compelling about their reading by using questions framed by the *COMPEL* acronym (Connection, Opinion, Main idea, Perspective, Evidence, and Language). This third, reflective step facilitated

ELLs' thinking deeply about what they were reading and the notes that they were taking.

The following sentence starters supported the reflection stage of the COMPEL strategy.

1. Write one personal **CONNECTION** to this paragraph (feeling, emotion, association, memory, text-to-text or text-to-world links)

   This makes me feel…..
   This makes me think about….

2. Write your **OPINION** of this paragraph.

   In my opinion….
   I agree/disagree with the author because….

3. Write what the paragraph is about (**MAIN IDEA**).

   This paragraph is about….
   Important ideas that support this are….

4. Write the author's message or **PERSPECTIVE** on the topic.

   In this paragraph, the author wants to….

5. Write the **EVIDENCE** that supports the author's message.

   The author's beliefs are made clear when…..
   An important detail is…..

6. Write the **LANGUAGE** (words, lines, literary elements or rhetorical devices—repetition, metaphor, alliteration, etc.) that supports the author's message.

   The phrase…..is important because…..
   The use of the word…..is powerful because….

This strategy was particularly effective for our ELLs because of the sentence starters. Often, the most difficult part of responding to text is getting started. When ELLs had the sentence starters to support them, rather than thinking about how to begin, they were focused on completing the idea that had been scaffolded for them.

Another powerful strategy that students used when they completed reading their group's chosen *In Our Village* book is **Collaborative Café.** Each group member wrote down key ideas from their chapter on the front of an index card focusing on unique topics from the culture/community, powerful quotes, striking statistics, etc. Beginner language learners were required to write three key details and were also provided with sentence frames. Once each student had an index card with key ideas, all students walked around the room and talked with classmates who had read other books.

The object of this experience was to share ideas from the text that the students read and to write down some new ideas on the back of the index card, based on discussion with peers during the roaming portion of exercise. Students returned to

their original groups and worked to create a mindmap that represented the way that they saw connections between their base text and the other texts read by their peers. This process allowed them to evaluate which information is important, synthesize this information, and communicate it in a visually appealing and appropriate way. These mindmaps were extremely helpful resources as students moved from the role of reader to the role of author. Students were able to reflect on how ideas were conveyed through the text and consider ways in which they wanted to emulate the style and structure modeled for them.

4.3 Students Communicated Their Ideas Effectively with Diverse Audiences

Based on their **model texts**, the *In Our Village* books read in groups, students developed their own class *In Our Village* book. Students worked individually or in pairs to write a chapter for the book. Each chapter focused on one cultural topic that represented the larger community but also the students' individual, smaller communities. These topics are decided upon by the teacher and students and based on their lived experiences. For example, chapter titles could include Our School, Greek-American Food and Dance, LGBT Youth, Mexican Superstitions, Cuban-American Family Life, Italian-American Pride, Being Biracial, American Sports and Games, Our Hopes and Dreams, etc. Students represented how their individual and shared experiences combine to form their unique community.

Cathy Berger Kaye, noted service learning consultant, has developed a curriculum guide for the *In Our Global Village* website that is excellent and could be accessed at www.inourvillage.org/IOGV. Within the curriculum document, she provides lesson outlines and handouts. A particularly helpful handout for the planning stage of this writing is the review of the table of contents that calls for students to mark off three chapters that seem most important (e.g. greetings, health, stores, transportation) and then to consider any information that they would still like to learn. Based on this reflection, students determine the topic of the chapter that they will develop for their book. Students considered which chapters they might want to adapt based on their own community as well as new chapter ideas that might be unique to their community.

To warm up and set expectations for the writing of individual chapters, we supported students as they engaged in the "Good Friends" writing exercise. The "Good Friends" chapter includes four paragraphs—first, an opening paragraph of 1–9 sentences; next a powerful 2–3 word sentence as its own paragraph; then a descriptive paragraph of 3–8 sentences relaying how friends treat each other; and finally, some quotes from friends about friendship and a closing. Students used this text structure as a model for their own "Good Friends" chapter. Once students had a feel for how to write a chapter, they focused on a topic that was particularly interesting to them for the class book and developed their own structure to convey their information.

While creating their chapters, students utilized technology in multiple ways. They read the online books and watched videos on the *In Our Village* website. They incorporated digital photos and also texted friends and family members for quotes to include. They sent out surveys via Survey Monkey to represent the beliefs and ideas of community members. This tech-based approach to action research was meaningful to the students because it broadened their perspectives, and it was a comfortable mode of communication for many. Google docs was used for students to collaborate and edit each other's writing and for the teacher to provide her own feedback.

Once the final chapters were finalized, students shared them with the class via a presentation mode of their choice: PowerPoint, Peardeck, Prezi, Googleslides, etc. Then students compiled their chapters and created a Flipbook which they uploaded to *In Our Village* website as part of the collections published there. This public sharing of their class book was especially motivating for students. According to Rodesiler & Kelley (2017), "Regardless of the media to be produced—print, visual, sound, or digital—providing students with the opportunity to generate new content and share it with a wide audience invites students to compose texts with the care and conviction that cannot be duplicated when writing solely for the teacher" (p. 28).

4.4 Students Translated Their Ideas and Findings into Appropriate Actions to Improve Conditions

Important to note is the story of how publishing *In Our Village* changed the lives of students in Tanzania. They went from a school with no books to a school with *In Our Village* books from around the world. Each school that publishes an *In Our Village* book is asked to send a copy to the students in Tanzania.

We challenged our students to think about how writing the story of their community might evoke positive change. Could they address issues that matter to them in their story? Is their community a model for how to embrace diversity? If so, what positive qualities/choices would they like to share with others who will read this book? We stressed that their book would be published on the *In Our Global Village* website. They were not just completing an assignment for a grade; they were writing for an **authentic audience**. Smith (2015) notes the importance of writing for more than a grade: "It is a writing teacher's responsibility not only to teach students how to write but why, and to give them opportunities today to practice those academic skills in meaningful contexts—contexts in which the writing realizes change in something other than the students' grades" (p. 72). After all, what we want our students to write purposefully and meaningfully and in doing so develop skills that will serve them well beyond the classroom and in life.

5 Conclusion

Using multicultural nonfiction and multimedia in the ELA classroom helped ELLs and native speakers develop intercultural competence in a way that we believe will be enduring. Students encountered multiple diverse perspectives and life experiences through reading, writing, listening, and speaking, and developed the ability to collaborate and communicate effectively with their culturally diverse peers. They were able to utilize means of communication beyond speaking in class and writing on paper. Students used their tech communication devices (phones, tablets, computers) and tech presentation tools to share their books. For many students, particularly, ELLs, this provided a level of comfort and an opportunity to think through language before sharing it.

The ELA classroom is the ideal environment for this type of approach to be used effectively because it allows the teacher the opportunity to use nonfiction and multimedia to engage students in learning experiences that develop intercultural competence. The teacher can select to teach high-quality diverse literature with authentic themes and characters that affirm ELLs' languages and cultures and send the message that diversity is something that makes us unique and individual and is to be valued and respected. Students read, discuss, analyze literary nonfiction and with the use of technology collaborate on creating texts about their own cultures. All literacy modes are addressed throughout the process that eventually leads to students developing their communication skills as well as cultural understanding and appreciation.

Because students were writing for an authentic audience, they took care with their work. They believed in the importance of it. This is especially important for ELLs who need to be familiar with varied communities and diverse audiences if they are to effectively share their stories with others. Providing opportunities for sharing experiences validates students' diversity and develops not only their language skills but also their confidence and belief in themselves.

Reflection Questions

1. Where are opportunities in your curriculum to engage all students in developing intercultural competence?
2. How can you incorporate communication using technology in meaningful ways in your classroom?
3. In what ways can you include multicultural nonfiction in your curriculum to support multilingual students?
4. Why is storytelling for an authentic audience beneficial for all leaners, but in particular ELLs?

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Part II
Mathematics

Keying English Learner Students into Mathematical Content: The *Things I Notice* Approach

Jill A. Perry and Beth Wassell

Abstract *Things I Notice* is a 3-phase approach to teaching mathematics. In this approach, teachers engage students in deliberately examining and interrogating features of mathematical representations or problem structures by providing independent noticing/thinking time, partner discussion time, and whole-class discussion time. The chapter includes a vignette of a high school teacher who uses the *Things I Notice* approach with a group of English Language Learners with varied proficiency levels in English. The authors also provide examples of ways in which *Things I Notice* can be enacted in a classroom to help English Language Learners engage as members of a community of mathematical discourse while supporting their oral academic language development. Finally, the authors provide practical guidelines for selecting and designing *Things I Notice* tasks, facilitating the approach, and using students' responses, both verbal and written, to inform instruction.

1 Introduction

In the last decade, researchers and practitioners have made a strong case for the challenges English Language Learners (ELLs) face when encountering discipline-specific academic language in mathematics and other content areas (e.g., de Oliveira, 2011; Schleppegrell, 2007; Zwiers, 2014). We have also encountered this in our work with in-service teachers who tell us that their ELL students flourish on assignments that involve completing basic computations, following procedures, or memorizing facts – tasks that have few language demands. Examples of these kinds of

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tasks commonly found in high school mathematics classes are "Solve for x. 7 – 3x = 25," "Calculate the mean of the given data set," or "Find the slope of the line through the points (3, −2) and (0, 4). However, ELLs tend to struggle with tasks that have high language demands (e.g., word problems, labs) or require them to explain their thinking in writing (e.g., explanations, proofs, written arguments), consistent requirements of the *Common Core State Standards* in grades K-12 (National Governors Association Center for Best Practices and Council of Chief State School Officers, 2010).

In this chapter, we advocate for the *Things I Notice* (*TIN*) approach, a linguistically responsive (Lucas & Villegas, 2013) approach to teaching mathematics. In this 3-phase approach, teachers engage students in deliberately examining and interrogating features of mathematical representations or problem structures by providing independent noticing/thinking time, partner discussion time, and whole-class discussion time. TIN can serve as a pedagogical tool to support ELLs both linguistically and cognitively through complex math tasks. Through this approach, teachers help ELLs make sense of mathematics while learning English (Kersaint, Thompson, & Petkova, 2009). This is no easy task since mathematics has its own *register*, or mathematical usage of natural language, that includes specific words and grammatical structures (Halliday, 1978). However, we argue that teachers must provide opportunities for ELLs to do complex, cognitively demanding tasks rather than watered-down or lower-level tasks that focus merely on memorization or procedural computation (Smith & Stein, 1998). This situates students as young mathematicians capable of thinking and acting mathematically.

In our work with students and their teachers, several features of the *Things I Notice* (*TIN*) approach consistently arise as advantages:

- *It is low stakes.* Because students' thinking, representations, and other mathematical work are the foci of the task, students are encouraged to put all of their ideas down without any penalties (in terms of points, grades, or an emotional reaction) for "wrong" answers.
- *There is something for everyone.* Mathematical representations, especially those that are not linguistically complex, have the potential to elicit student thinking at multiple levels. Ultimately, they provide students with access to complex mathematics content and help ELLs key in on features of the language of mathematics. Many times, in complex tasks, the door is only open to the students who are already "in."
- *It teaches students to take time with and make sense of what they are given.* Many students do not know what to do when given a task and time to work independently. Once it becomes a habit of mind, *TIN* is a strategy that students can summon whenever they confront a new task. They can begin just by asking themselves, "What do I notice?" Many students have remarked that doing this "slows down time" for them and makes them "less nervous," which helps them to think.

- *It cues students into knowing that mathematical objects/representations have meaning.* Because the focus is solely on "noticing," *TIN* reiterates that representations are an important part of mathematics that provide context and meaning.
- *It is a great formative assessment. TIN* provides an opportunity for us to find out where students are mathematically before engaging in formal lessons. We can determine where the gaps are. As a wraparound, at the end, we can have students revisit their initial thinking and create a record of their growth.
- *It is a great way to make sure everyone is ready for the day's work by focusing students' attention on the important mathematics. TIN* supports students in getting ready to learn new mathematics by activating and extending their current mental constructs and schemata.

The *TIN* approach can be used to launch a complex task, orient students to the key mathematics concepts, and build or activate background knowledge, all of which are important to helping students gain access to mathematics.

2 Approach to Teaching Mathematics to ELLs: *Things I Notice*

When we sit down to plan a lesson, one of the things we think about is how to make the day's work accessible to all of our students — to invite all students into the mathematics and mathematical discourse. This is particularly important for our ELL students. We ensure that the first few minutes of class enables students to transition from their last class and the hubbub of the hallway to the mathematics we want them to ponder. The *Things I Notice* approach has become one of our go-to routines to make this transition time meaningful to students and informative for us. Depending on our instructional purpose, we might use *TIN* as a quick assessment prior to teaching a new unit, a launch to a rich task, a way to focus students on specific mathematical representations, or a means to building and activating background knowledge, understandings, and skills. It is important to note that building a routine around an approach like *TIN* is critical; most students, including ELLs, benefit from classroom routines that are consistent, rather than having to interpret different directions every day.

Things I Notice integrates core ideas from mathematics education and from applied linguistics. These are two worlds in educational research and practice that rarely meet; however, in thinking through the possibilities of teaching practices that would support mathematics learning of ELLs, we began to envision the ways in which the *mathematics task analysis* approach (Smith & Stein, 1998) might work alongside Cummins's (1981) notion of Basic Interpersonal Communicative Skills (BICS) and Cognitive Academic Language Proficiency (CALP), commonly called *BICS and CALP.*

The mathematics *Task Analysis Guide* (Smith & Stein, 1998) enables teachers to analyze instructional tasks in mathematics to determine their cognitive demand. It

has four levels that emphasize different levels of cognitive demand, the lowest of which requires a student's recall of *memorized* facts, rules, formulas, or definitions. For example, a student memorizing the order of operations required by the acronym PEMDAS, without knowing the conceptual understanding behind the order, would fall into this level. The second level features knowing *mathematical procedures* with no connections. At this level, a student might know how to solve for the value of "x" in the equation $x + 4 = 17$, but might not understand the reasoning behind the algorithmic procedure. Both the *memorization* and *mathematical procedures* levels require lower levels of cognitive demand. A third level is *procedures with connections,* which requires students to follow procedures while developing deeper levels of understanding of mathematics concepts or while applying the procedures to contextual problems. The tasks at this level involve multiple types of representations, such as manipulatives, diagrams, symbols, and word/story problems, and students are encouraged to identify connections among them to make meaning. Finally, the *doing mathematics* level requires both "complex and non-algorithmic thinking, … self-monitoring or self-regulation of one's own cognitive processes, … [and] requires students to access relevant knowledge and experiences and make appropriate use of them in working through the task" (Smith & Stein, 2011, p. 16). At the doing mathematics level, tasks have multiple entry points, multiple pathways to a solution, and, often, multiple solutions. The latter two levels require a high-level of cognitive demand. It is important to note that teachers must match the tasks they plan with their objectives for student learning. At times, this will require task design that emphasizes lower-level demands through memorization or procedures without connections. However, engaging all students in tasks with high cognitive demand is essential if students are to learn mathematics with understanding (Smith & Stein, 1998).

Cummins's model of *BICS and CALP* was introduced in the 1980s as a conceptual framework for examining classroom situations for bilingual students and instructional practices typically used by their teachers. His model focuses on "the range of cognitive demands and contextual support involved in particular language tasks or activities (context-embedded/context reduced, cognitively undemanding/cognitively demanding)" (Cummins, 2008, p. 76). In this framework, Cummins defines "context" as including what students bring to a task, such as their motivation, prior knowledge, or interests, and the different supports that teachers can use to help students during the task, such as visual models, graphic organizers, and home language supports.

Cummins defines "context-embedded" as tasks that include visuals, adapted language, graphic organizers, or other modalities in an attempt to simplify the language demands associated with a task. His work has been used by many educators with whom we work to interrogate their own teaching and assessment practices in bilingual, sheltered, content-area, and English as a Second Language (ESL) classroom settings. We encourage teachers to ask whether their tasks and assessments require high cognitive demand, yet provide enough context embeddedness to "lighten the language load" for students. Tasks that incorporate BICS are context-embedded but lack cognitive demand, such as following the steps of a simple computational task being modeled by the teacher. Tasks with CALP traditionally tend to be cognitively demanding but light

in context, such as word problems without any visual cues or diagrams. We know our students develop BICS more quickly and through everyday interactions, but we need to design learning experiences to help them to develop CALP.

Ultimately, the *mathematics task analysis* framework and *BICS and CALP* have two key elements in common. They both emphasize higher order thinking in academic tasks, and in both, context plays a significant role. The *Things I Notice* approach fosters opportunities for ELL students to do high-order mathematics while recognizing the CALP that students need to be successful. In the *Things I Notice* approach, students participate in a Think-Pair-Share activity (Lyman, 1981) with a focus on noticing features of mathematical representations. In this approach students are asked to examine mathematical representations (e.g., diagrams, graphs, expressions, formulas, tables) and record the things they notice; discuss their ideas with a partner; and then participate in a teacher-facilitated, whole-class discussion. Teachers can use the approach to engage students in higher-level tasks described in the mathematics task analysis guide while supporting and building ELLs' development of CALP. We share an example of this approach in practice in the Implementation section below.

3 Theoretical Foundations of the Approach

Two key assumptions, undergirded by a sociocultural framework, underlie the *Things I Notice* approach: participation in a community of discourse and systemic functional linguistics (Halliday, 1978; Schleppegrell, 2007). These theoretical foundations take into consideration the classroom community in which students do mathematics along with the linguistic demands required to understand, talk about, and write about mathematics.

The *Things I Notice* approach assumes that ELLs are doing mathematics *in and with* a group of other students with the support of a teacher or teachers. In this context, students have an opportunity to communicate their thinking publicly and consider the ideas of others, thereby engaging in a *community of mathematical discourse* (Sfard, 2007). In this view of a supportive community, a student's participation moves from the collective to the individual whereby both the mathematics learning and the language learning is scaffolded (Vygotsky, 1978) by the teacher(s) and by other students until a task can be done independently. However, when given a task, students also need independent think time, during which they negotiate understanding with *themselves*, what Sfard (2007) calls *commognitizing*. After this independent think time, students should be provided with opportunities to negotiate meaning with their peers in low-risk settings (Lyman, 1981). Over time, students develop conceptual understanding and are able to communicate more flexibly and with more facility about a given mathematical discourse (Sfard, 2007).

The *Things I Notice* approach also draws on systemic functional linguistics in that it assumes that teachers have a role in supporting "the development of the multisemiotic mathematics register through oral language that moves from the everyday

to the technical mode" (Schleppegrell, 2007, p. 156). When we describe a mathematics register as multi-semiotic, we mean that it encompasses not just the words, but also the typical grammatical functions, symbols, notation, and signs that individuals use to communicate about mathematics and make meaning in mathematics. As educators, our role is to help students comprehend the register inherent in the mathematics classroom and to support students to use this register to communicate while they are doing mathematics tasks.

4 Implementation of the Approach

Ms. Jackson teaches seventh-grade mathematics to a mix of English-only and ELL students at different English proficiency levels in a sheltered classroom. She is looking ahead to the probability unit her seventh graders will begin soon. She decides to use a series of *Things I Notice* tasks to assess their readiness for the unit and to build their background knowledge and skills. She is keenly aware of some of the specific needs of her ELL students, and is hoping to support their linguistic and cognitive needs in mathematics through the approach. Ms. Jackson chooses to start with a picture of a spinner (see Fig. 1) that they will eventually use in one of the games of chance they will play and then analyze for fairness. Though the context of the game is removed, she will be able to assess students' understanding of fractions and the sense they make of this type of representation.

As students enter the room, they pick up a "thinking sheet" from the bin by the door and make their way to their desks. Projected onto the screen at front is a picture of the thinking sheet and the instructions, "On your own for 3 minutes: Examine the information given on your Thinking Sheet and record (write down) the things you notice." Although these directions are the same every time she uses the TIN approach, she closely monitors her newcomer ELL students to ensure that they comprehend the directions and have begun to work on the task. Most students

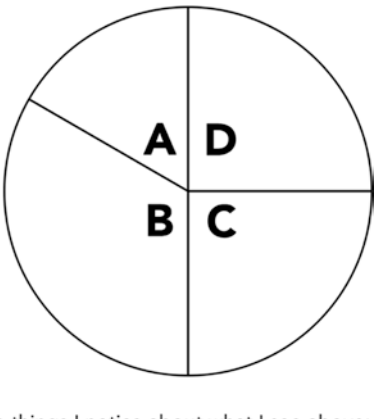


Fig. 1 Spinner visual that is used for a *TIN* task

glance at the screen and then begin 3 min of independent work time by responding to the prompt on the thinking sheet (see Fig. 1).

Ms. Jackson circulates as students work, observing that most of them have written something on their paper. Some of the responses she notices are: the figure is a circle; "it's divided into 4 parts;" "the letters A, B, C, and D are in the sections;" "C and D are equal;" or "C and D are each 1/4." Several have noted that "it looks like a pie chart," while others say, "it looks like a pizza." Since Ms. Jackson encourages students to use their home languages, she notices that two of her students have written their initial thoughts in Spanish and one has written in Arabic. Two students wrote, "it looks like a game spinner." Something unexpected that Ms. Jackson sees on a few of her students' thinking sheets is "A is 1/4 but smaller and B is 1/4 but bigger." She notes this significant misconception on her clipboard and starts to think about what a class discussion around this might look and sound like, given that her class includes a mix of English-only students, bilingual students with intermediate levels of English proficiency, one newcomer student, and one advanced level English learner who also has an IEP.

After 3 min, Ms. Jackson asks students to talk with their "shoulder partners." She says, "With a partner for 4 minutes: Take turns sharing the things you noticed. Your goal is to understand what your partner shares. Then find something new together." To support her ELL students even further, she uses hand motions and gestures and articulates the directions slowly. Without any additional prompting, students face their partners and talk about what they noticed. Ms. Jackson circulates, eavesdropping and recording on her clipboard the mathematical language they use and how they use it. Because of the ways students are seated, she anticipates that several of the pairs will discuss the "A is 1/4 but smaller and B is 1/4 but bigger" idea — and they do. One pair signals that they have a common question, a routine she has built into this task, by both raising their hands. When she kneels down next to the pair, Ahmed asks, "What does 1/4 mean?" Jazmín, expanding on the question, asks, "Does it mean four equal parts? Like this? [Jazmín draws a circle cut into four congruent sectors]. Or like the picture [points to the image on the paper]?" Ms. Jackson asks what each of them thinks and why. Jazmín says, "I think they have to be equal parts because that's what fractions mean — equal parts. The bottom means number of *equal* parts." Ahmed says he isn't sure but he knows that "C and D are 1/4 each." As she looks around the room, Ms. Jackson sees two more pairs of students with their hands raised. She tells Jazmín and Ahmed that what they are thinking about is very important and alerts them that she will ask them to share their question during the whole-class discussion. She asks them to find something new together while she checks in with the other groups. As expected, the other pairs have the same question. She briefly checks in to see what their thoughts are, records her notes, and then, seeing that the 4 min are just about up, she begins to call the class together.

Ms. Jackson starts the class discussion by saying, "There has been a lot of important noticing happening in here today. I'd like to start our conversation like we always do. Does someone think you noticed something that a lot of your classmates noticed?" Several students raise their hands. Ms. Jackson calls on Thao, a student who came to the US last academic year, and is sometimes reluctant to share her

ideas during whole-group discussions. Thao quietly says, "It's a circle with 4 parts." Ms. Jackson asks students, "How many of you noticed this?" Everyone raises a hand. Ms. Jackson responds, "Thao, your classmates definitely noticed that!" She then asks Thao to choose the next student to share. After several students share what they noticed, Ms. Jackson says, "Jazmín and Ahmed had an important discussion about an issue that several other groups had, as well. I've asked them to share it with the class so that we can sort this out together."

In the vignette above, Ms. Jackson used *TIN* both to assess student understanding and to build and activate background understandings. Throughout the task, she was also able to be especially attentive to her ELL students' linguistic needs in a way that also supported their cognitive needs. Her students have internalized the routine as a part of their transition to her classroom. In this case, she used it to bring to the surface what students understand and misunderstand about fractions prior to launching a unit on probability. She was also able to use this time to confront a major misconception. Because there were students in her class who held this misconception and students who held conventional understandings, she was able to facilitate a discussion that positioned students as capable of teaching and learning from each other.

In revisiting our glimpse into Ms. Jackson's classroom, we are able to see the general flow of the *TIN* approach when all three phases (i.e., *On Your Own*, *With a Partner*, and *As a Class*) are used.

On Your Own We begin the *TIN* approach with students working *on their own* (usually for between 3 and 6 minutes). As students enter the room, we greet them and hand them a thinking sheet containing a mathematical representation (or two or three). Students are given a printed copy of the task so that they do not spend time recreating (and possibly innaccurately copying) what they see. To orient students to the task, we project (or write on the board) these instructions:

On Your Own
For [#] minutes:

1. Examine (look closely at) the information given on your Thinking Sheet and
2. Jot down (record) the things you notice.

The first time we use these instructions with students, we explicitly teach the words "examine," "look closely at," "jot down," and "record" as synonym pairs – each pair includes one example of colloquial language, and one that features academic language. We ensure that ELL students understand exactly what these verbs require them to do, incorporating Total Physical Response (TPR) gestures or movements (Herrell & Jordan, 2016) with students when possible. As the weeks progress, we begin to take away the informal language scaffolding and use only the academic language in the directions.

As students work independently, writing down some of the things they notice about the information they have been given, we circulate and record what we notice about their work. We provide the option for ELL students to use their home

languages. We look for evidence of the mathematical sense they are making of the representations, the vocabulary, including both academic and informal language they use, the inferences they draw, the representations they create, and the features they highlight. We also look for evidence of engagement and struggle, including who starts writing quickly, who hesitates, who looks at us for guidance, and who seems stuck. We check in with students as needed and, over time, are able to learn students' thinking habits. We also begin to learn the additional linguistic supports that ELL students may need throughout the task.

When we feel like we need to check in with students who do not seem to have gotten started, we kneel next to them and first ask, "Am I interrupting your thinking?" We believe that students are the best monitors of their own progress and that asking this question sends this message to students. It also reminds us that we are there to help them surface their thinking, not to impose our thinking on them. Students have been quite honest with us when we are getting in the way, when they have questions, and when they have just not been attending to the task. The purposeful way we select representations usually ensures that everyone notices something, but sometimes we check in just in case. When students are stuck, we offer a jump-start question to consider (e.g., "Does this look like anything I have seen before?" "Can I find a pattern?") and then leave them to work. At times, we add a word bank (often with terms both in English and students' home languages) to nudge students' thinking a bit (See Fig. 2 for an example of a *TIN* with a trilingual word bank).

With a Partner After students have had time to think on their own, we shift to partner time, when students *take turns sharing* what they have noticed with a partner (usually between 3 and 6 min). When possible and appropriate, we pair students who have the same home language together, so they can share in a language that is most comfortable for them. After they have shared, if there is time remaining, they are to *find something new together*. To orient students to this new phase, we project (or write on the board) these instructions:

With a Partner
For [#] minutes:

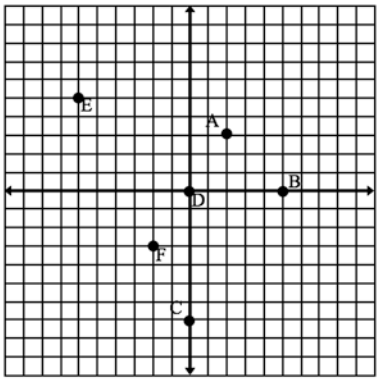
1. Take turns sharing the things you noticed and
2. Find something new together.

If you have a question, both (or all 3) of you must raise your hands to indicate (show) that you have a group question.

There are times when we prompt students before they share with a partner to select and use a different writing implement (e.g., pencil to pen, blue ink to black ink) for the remainder of the *TIN* time. We have found this move to be effective in helping us to see what students are able to do on their own and then what they attend to with a partner or during the whole-class discussion. This adds a dimension to our assessment and enables us to document student progress a little more richly.

As students talk with each other, we monitor their conversations, answer their questions, and make note of what students do and do not understand. When students

Just ***Plain*** Fun? Just ***Plane*** Fun?



Examine the *coordinate plane* shown above. Record some of the things you notice. Use as many words from the Word Bank as you can to describe what you notice.

English	Spanish	Chinese
axis	el axis	轴
coordinate	la coordenada	坐标
equation	equación	方程式
horizontal	horizontal	水平
intersect	intersecarse	交点
linear	lineal	线性
origin	el origen	原点
plane	el plano	平面
point	el punto	点
quadrant	el cuadrante	象限
slope	la inclinación	斜度
vertical	vertical	垂直

Fig. 2 A sample *TIN* task that includes a word bank in English, Spanish, and Chinese

raise their hands, the first question we ask them, before we kneel down next to them, is, "Is this a partner question for both of you?" If the answer is "no," we ask the students to discuss the question and then call us back over if they are not able to answer it together. If the answer is "yes," we kneel down next to the group and select

the student who will ask us the question. Sometimes the question is one we need to answer because it does not take away opportunities for thinking and will help students move forward. Sometimes we pose a question in response to give students a different entry point into the mathematics. And sometimes we table the question and ask students to bring it to the whole-class discussion. Throughout this time, we remember to forefront the purpose of the activity and begin to map out our next step: the whole-class discussion.

As a Class We typically open our whole-class discussion by posing the question, "Will someone share something you noticed that you think a lot of your classmates noticed?" We typically do not cold call on students at this point, but ask students to volunteer their thinking and to consider the thinking of others. Before we call on a student, we remind all students to listen to the speaker and then signal that they noticed the same thing via a shared gesture such as thumbs up, a raised hand, or the American Sign Language sign for "you and me." We record students' thinking on the board, on the document camera, or on chart paper so that students can refer to it as they engage in an interactive lecture or work on subsequent tasks or a lab.

If, during the discussion, students share something that is really an answer to a question that they have posed on their own, we say, "That sounds like a *conjecture*. What did you *notice* that helped you to make that conjecture?" This honors students' thinking, positions them as mathematicians who pose problems and make conjectures, and orients them and others to key features of representations that lend themselves to mathematical problems to consider.

After asking one or two more students to share what they noticed, we shift the conversation to our instructional purpose for the *TIN* either by having specific partners pose a question they had or by sharing a noticing or posing a question we want students to consider. When we are launching a task, for example, we make sure that we bring to the surface anything that needs to be addressed before students begin working on the actual task. We are very careful not to lead students to solving the problem. The point is to set students up for engaging in productive struggle (Hiebert & Grouws, 2007; Warshauer, 2015) while solving a rich problem.

We follow this flow all the way through when we are launching a rich task or lab; focusing students' attention on specific mathematical representations; leading into an interactive lecture; or building and activating background knowledge, understandings, and skills. Figure 3 provides examples of what *TIN* might look like both as a formative assessment and as a lead-in to a complex task.

When our intention is to use the *TIN* approach as an assessment of prior knowledge, we typically only have students work individually for 4–6 minutes and then collect their work from them. Sometimes, we use the initial task as a wraparound assessment. At the end of a lesson (single or multi-day), we give students a clean copy of the *TIN* task and ask them to revisit the task. This provides us with an informal pre−/post-assessment cycle. We also do this with *TIN* tasks used prior to a unit as an assessment. Choosing key representations from a unit, lesson sequence, or lesson gives us a sense of students' familiarity, comfort, and skill with those representations.

Things I Notice Used as an Assessment with Focus of Representation

One of These Things Is Not Like the Other

$20r + 34c = 504$ $15r + 17c = 327$ $10r + 17c = 252$

These are some of the things I notice about the equations I see above:

Content Addressed:
linear relationships (7th/8th grade); linear relationships, systems of equations (Algebra I)

What a Square!

2	3	4	5	6
4	6	8	10	12
6	9	12	15	18
8	12	16	20	24
10	15	20	25	30

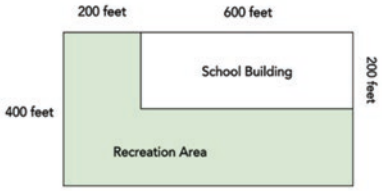
These are some of the things I notice about what I see above:

Content Addressed:
multiples (3rd grade); ratio and proportion (6th grade); linear relationships (7th/8th grade); functions, quadratic relationships (Algebra I)

Things I Notice Used to Launch a More Complex Task

Covering Ground

SciMath School District is planning to fence in the recreation area at Mathy Middle School. A diagram of the school and recreation area (shaded) is given below. The recreation area is going to be covered with grass.



These are some of the things I notice about what I see above:

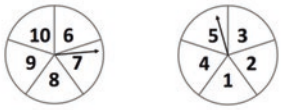
Next Steps:
This TIN is a lead-in to this task:
The SciMath School District is planning to fence in the recreation area at Mathy Middle School. The recreation area is going to be covered with grass. How many square feet of grass will be needed?
Extension Task:
They have decided to use sod (instead of grass seed) so that the recreation area is ready for students to use right away. The sod they have chosen comes 500 square feet per pallet. A pallet costs $430. How much will it cost to cover the entire recreation area with sod?
Possible supports:
(1) a picture of sod vs. grass seed; (2) picture of sod in pallets

Spinning = Winning?

You will be using the two spinners shown below for our mathematics lab today.

The rules of the game are:

- The game is designed for 2 players.
- Player One will spin both spinners.
- If both arrows land on even numbers, that player earns 1 point. Otherwise, Player Two receives 1 point. (Player Two never spins.)
- Player One continues to spin both spinners until one player reaches 10 points.



These are some of the things I notice about these spinners and this game:

Next Steps:
This leads to a lab wherein students run multiple trials, collect data, analyze that data, and then make a conjecture in response to this question: *In a fair game, each player is equally likely to win. Is this a fair game?* They are then challenged to prove (or disprove) their conjecture.
After being given several new sets of spinners (with the same rules), students are to devise an efficient way to determine if two spinners make a fair game.

Fig. 3 Four examples of TIN tasks: two for formative assessments and two that can serve as a lead-in to a complex task

5 Conclusion

The *Things I Notice* approach provides an opportunity to engage ELLs in complex mathematics, both linguistically and cognitively, in a way that draws on their strengths and funds of knowledge, key features of linguistically responsive teaching. Because *TIN* is low stakes and often context embedded, it supports ELLs as they become more comfortable using the mathematics register and moving toward conventional academic language. It also invites them to engage in a community of mathematical discourse where their thinking and sense-making is an important part of doing mathematics. *TIN* provides a safe space for students to negotiate with each other, make their work public, and then work as a class to come to a shared understanding. Meanwhile, as teachers, we learn about our learners through this process. This repositions our work from students "understanding the teacher's thinking" to us understanding the students' thinking. With appropriate scaffolding in *TIN*, students develop understanding alongside content-specific academic vocabulary that is grounded in the mutli-semiotic register of mathematics. Ultimately, the *TIN* approach moves students closer to our primary goal: positioning them as young mathematicians.

Reflection Questions

1. How might you incorporate the *Things I Notice* approach into your teaching of mathematics? Think about a particular unit and identify specific representations that might help students cue into key mathematical features. In what order might you present these to students to build their understanding over the course of the unit?
2. How might the *Things I Notice* approach be adapted to be used with other content areas, such as science, social studies, ELA, art, health, or music? What representations would you use as a starting point for one of these content areas?

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Doing and Talking Mathematics: Engaging ELLs in the Academic Discourse of the Mathematical Practices

Rita MacDonald, Sarah Lord, and Emily Miller

Abstract It is critical that educators promote full inclusion of English language learners (ELLs) in STEM courses. This chapter presents a process and resources for enacting a discourse-centered pedagogy that builds mathematical understanding while simultaneously engaging and supporting students to develop the language of complex thinking. Using a small set of Teacher Discourse Moves and Student Discourse Moves, teachers focus on deepening students' mathematical reasoning in ways fully inclusive of ELLs, while also helping all students build the language of complex thinking and mathematical argumentation.

1 Introduction

Since the adoption of the Common Core State Standards (CCSS; National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010) many educators have noted changes in the landscape of teaching and learning. One teacher with whom we worked exclaimed, "New teacher or old teacher—doesn't matter. We're all on a new playing field today!" The CCSS, taken overall, increase emphasis on students' critical thinking, problem solving, and analytic tasks in core academic subjects. In mathematics, the Standards for Mathematical Practice (or more simply stated, the mathematical practices) articulate habits of mind that constitute mathematical reasoning, stating: "One hallmark of mathematical understanding is the ability to justify, in ways appropriate to students' mathematical maturity, *why* a particular mathematical statement is true or where a mathematical

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https://doi.org/10.1007/978-3-030-02245-7_8

rule comes from" (National Governors Association for Best Practice & Council of Chief State School Officers, 2010, p. 4).

The mathematical practices "implicitly demand students acquire ever-increasing command of language in order to acquire and perform the knowledge and skills articulated" (Council of Chief State School Officers, 2012, p. ii). These changes have broad implications for English language learners (ELLs), especially regarding the dialogic, discourse-rich nature of the mathematical practices. Students—all of them—need to be talking more and talking together. An increase in collaborative, reasoning-focused discussion affords ELLs a tremendous opportunity to strengthen their effectiveness in using English.

Yet, at a time when ELLs are the most rapidly growing segment of the K–12 student population, ELL instruction is often characterized by patterns that do not maximize ELLs' opportunity to learn:

- In whole group work, many teachers continue to use primarily rapid-paced IRE interaction patterns (teacher *inquires*, student *responds*, teacher *evaluates* (Schegloff, 2007)), which move rapidly through a planned series of teacher or textbook ideas rather than explore student ideas and which also provide few opportunities for students to say more than a few words or phrases.
- In small working groups, valuable student conversation opportunities tend to be focused on procedures and task accomplishment, rather than on meaning-making, and either exclude ELLs altogether or position them as listeners rather than initiators of ideas.
- Mathematics instruction for ELLs often attempts to take language out of mathematics by focusing on worksheets of number-only computational problems.
- Language development in mathematics is still often viewed primarily as vocabulary instruction.

Classroom practices like these offer ELLs few opportunities to develop the linguistic skills necessary for effective engagement in the mathematical practices and in the rich academic discourse that helps all students learn to reason deeply and critically and express their reasoning effectively.

Given the opportunity gap that exists for ELLs in many classrooms and their low rate of involvement in STEM careers, the need for resources that are fully inclusive of ELLs is critical. Although some see disproportionate engagement in STEM careers as a function of ELLs opting out of STEM at the college level, Pruitt (2015) remarks:

> The "leaky" STEM pipeline is a problem, but not having students to go into the pipeline is a bigger problem… significant portions of the U.S. population cannot even see themselves in STEM careers because they feel science is reserved for some kids, not all. (p. 2)

This chapter will offer mathematics teachers a set of resources to support their shift to reasoning-focused instruction, their efforts to strengthen students' reasoning, and their support of students' increasing effectiveness in language use—all of this in ways fully inclusive of ELLs as sense-makers along with their classmates. Additional resources and video examples of this approach in use can be viewed at the project website, Doing and Talking Math and Science, at http://stem4els.wceruw.org/

2 Approach to Teaching Mathematics to ELLs: Doing and Talking Mathematics

The teacher's comment above about the new playing field emphasizes the new roles we are all invited to step into. Many of us have experienced teaching and learning as the delivery of knowledge, rather than the co-construction of knowledge, but new content standards call for a new way of operating. The strong emphasis on students' critical thinking and collaborative problem-solving as reflected in the Standards for Mathematical Practice transforms the work of teaching and learning in powerful ways.

We have worked with a group of mathematics and science teachers to describe the new roles for both students and teachers. Teachers identified key aspects of their new role as creating opportunities for students to reason together about complex questions that matter, and focusing more on the quality of the students' mathematical reasoning than on the immediate correctness of their answers. Additionally, teachers noted the importance of helping students persevere in the work of understanding one another's reasoning, and of modeling more precise or complex language when and if it was needed. Students' roles shifted to align with these changes, requiring careful listening to and tracking of one another's logic, and acceptance of the responsibility to always be ready to comment on the idea under consideration. These new roles are congruent with the descriptions of teaching and learning endorsed by the National Council of Teachers of Mathematics in *Principles to Action: Ensuring Mathematical Success for All* (Leinwand, Brahier, & Huinker, 2014).

2.1 The New Game: Strengthening Reasoning, Strengthening Language

The mathematical practices focus our attention on students' critical thinking and collaborative problem-solving—skills that extend beyond school into family life, successful work, and civic engagement. They remind us that learning mathematics is much more than memorizing formulas or procedures or definitions. Learning mathematics involves learning to construct and convey meaning in particular ways by doing new things such as arguing from evidence, specifying the conditions under which something may be true or untrue, and creating models to help explain emergent understanding. In this regard, ELLs are meaning-makers along with their peers. Everyone in the class is learning new ideas and new ways of thinking, and—since no one is a native speaker of academic language—everyone is learning new ways of using language.

We recognize that ELLs come to their classrooms with multiple ideas about numbers and patterns as well as with experience in making meaning in one or more languages. Given these strengths, ELLs are well able to engage in mathematical reasoning and, when properly supported, able to engage in discussion of their reasoning. If we educators are successful in tapping into those assets and capacities

by positioning students as questioners and thinkers and positioning ourselves as facilitators of student reasoning, so that we engage ELLs alongside their classmates in the iterative and collaborative sense-making practices of mathematics, both ELLs' knowledge of mathematics and their linguistic effectiveness will be strengthened. A graphic illustrating this approach can be found on the project website, http://stem4els.wceruw.org.

Grounded in a *language in use* approach, we focus not on a preconceived notion of the language *of* mathematics, but instead on language *for* mathematics. We focus on supporting students' collective engagement in the analysis of complex ideas and on exploring, analyzing, and critiquing one another's ideas. We also focus on the language they need to explain their complex thinking to one another. Mathematical terms and definitions are learned along with the language for explaining ideas, but student learning is grounded in experience with the concepts or entities described by those terms and in the activity of working with those concepts with classmates. One teacher using this approach remarked with surprise that she no longer had to preteach definitions because her students learned the meanings through activity.

This focus on language *for* mathematics means that teachers attend to students' ability to convey their intended meanings effectively—not always with perfect grammatical correctness, but effectively enough that others can understand. Teachers implementing this approach are not focused primarily on linguistic correctness, but instead pay attention to supporting students' growing effectiveness in conveying their ideas to others by marshaling the full range of the semiotic resources they possess: drawings, gestures, and words or phrases from multiple languages. Teachers offer models of additional ways of conveying meaning when needed, and, over time, students take up these suggestions as they are able. We have seen that the need for students to make sense of ideas together serves as an engine that drives language development. A number of teachers noted that the ELLs in their classrooms seemed more comfortable speaking up and taking risks with new language, and that their classmates had become more patient and persistent in their efforts to understand ELLs, asking questions to clarify their intended meanings, and suggesting new ways of conveying those meanings. In short, students were helping one another learn language.

This approach works well in content classrooms since it is focused on helping students do meaningful things with language during content learning. We focus on helping ELLs learn language *while* and *through* doing mathematics alongside their classmates—not beforehand or as separate from mathematics. Language serves as a tool for collaborative meaning-making, and learning is intimately connected to shared activity and to students' needs to construct meaning together. Students learn to *talk* mathematics as they learn what it means to *do* mathematics.

2.2 A Three-Part Game Plan

To be effective as educators and students on this new playing field may call for a change in familiar, well-scripted instructional methods. Together with experts in mathematics education and with participating teachers, we developed a set of resources to support this move toward a reasoning-centered, discourse-rich style of instruction. Our three-part "game plan," described in detail below in the Implementation section, is designed to assist educators in creating opportunities for collaborative meaning-making, for probing and strengthening students' mathematical reasoning, and for facilitating students' equitable engagement in critical, reasoning-focused discourse.

3 Theoretical Foundation of the Approach

The project's focus on ELLs as collaborative meaning-makers in mathematics is grounded in a *language in use* perspective. Some approaches consider language development to be a student-internal, cognitive accumulation of progressively more complex syntax and more varied, specific, or finely nuanced vocabulary in order to accomplish a broader range of functions over time (Heritage, Walqui, & Linquanti, 2015). In the implementation of such a "language as accumulation" view, it is often thought that students first come to *know* (language) and then they *do* (mathematics). This perspective can inadvertently support a deficit model of instruction that constrains ELLs to language-simplified classrooms and precludes their opportunities to engage in cognitively challenging courses that could foster their growth as learners and effective users of English. In contrast, the *language in use* approach views the process quite differently: By *doing* (mathematics) together, students come to *know* (language). In other words, language is viewed not as something internal that can be developed before the action, but as learned in the course of action, and more specifically, through action that occurs among individuals in a shared and meaningful context. In this sociocultural approach, meaning does not reside solely in language, but is a larger construct developed through negotiated and shared experiences during which participants construct and represent meaning together (Gee, 2005; Rogoff, 2008). To create meaning requires immersion in experience. Put simply, meaning is not stored language; meaning is shared experience (MacDonald & Molle, 2015).

In our approach, using a *language in use* perspective, shared activity drives language development. All students, including those still developing English, are given opportunities to engage in collaborative reasoning with resources and support for their engagement as active sense-makers. ELLs are provided the opportunity and

support to be initiators of ideas along with their classmates, rather than simply passive responders. Language development for all students is thus deeply contextualized within equitable and interactive sense-making. Instructional attention is focused on students' effectiveness at marshaling their full range of sense-making resources (linguistic and other) in the service of their learning, rather than on the correctness of their language. This is an important and supportive shift, considering the rapidly growing number of ELLs in U.S. classrooms, many of whom may require years of English language development before their language is fully proficient. ELLs can, and do, engage in important reasoning and learning with imperfect language and it is this "doing" that supports their development of increased effectiveness in using English.

The affordances of the *language in use* approach align well with the language expectations and opportunities provided by STEM courses, as illustrated by the following quotes:

- "For all students, the emphasis should be on making meaning, on hearing and understanding the contribution of others and on communicating their own ideas in a common effort to build understanding" (Lee, Quinn, & Valdés, 2013, p. 3).
- "Effective teaching of mathematics facilitates discourse among students to build shared understanding of mathematical ideas by analyzing and comparing student approaches and arguments" (Leinwand et al., 2014, p. 29).
- "Only an emphasis on language as action … engages students in the meaningful learning of new disciplinary practices while simultaneously strengthening their language uses in those practices" (Heritage et al., 2015, p. 32).

Efforts to strengthen students' reasoning are not easily supported using a view of English development as the accumulation of more complex syntax and vocabulary. Indeed, as stated by Heritage et al. (2015), "teaching form and function in isolation from real, meaningful, discourse-based communication has not produced generative, transformative learning for ELLs" (p. 31). The *language in use* perspective does, however, focus attention on students' interactive meaning-making and harnesses the power of that interaction to support their growth in English.

Supported by a grant from the National Science Foundation, we developed a set of resources to support educators' and students' moves toward a reasoning-centered, discourse-rich style of instruction that works to simultaneously strengthen students' reasoning and effectiveness in using English. Our work began with a review of the literature on discourse for learning mathematics (Chapin, O'Connor, & Anderson, 2003), science education (Windschitl, Thompson, & Braaten, 2011; ambitiousscienceteaching.org), and on fortifying ELLs' complex language use (Zwiers, O'Hara, & Pritchard, 2014). Although known within the field of teacher education, these resources were not well known by teachers in our project. Many had not been produced in formats easily accessible to classroom teachers, and none that we discovered offered a simultaneous focus on both teacher and student actions. Central to our project was the intent to develop resources that: (a) could be quickly put to use by classroom teachers, (b) situated learning in an interactive context, (c) were generative rather than exhaustive in nature, and (d) supported not only changes for teachers but also students' agency as active learners and discourse partners.

4 Implementation of the Approach

This approach was developed primarily for content teachers, not language teachers. It focuses first on strengthening students' reasoning in STEM courses and secondarily on leveraging the opportunities provided by disciplinary practices (e.g., the mathematical practices) for increasing students' effectiveness as users of English. Both content teachers and ESL-content teacher teams have found it effective in supporting students in content classrooms, since the approach focuses on helping students construct and convey meaning during their content learning (MacDonald, Miller, & Lord, 2017). Both teachers and students focus on language as a tool for meaning-making, and learning is intimately connected to shared activity and to students' needs to construct meaning together.

Our approach has three components. Although we will describe them separately, and they can be learned and practiced in a variety of combinations, all three work together, and experience has shown that students and teachers need to put some of each element into play before beginning to experience the benefits of the approach.

4.1 Opportunity for Collaborative Meaning-making

Teachers in our project have described part of their "new role" as having responsibility to provide rich opportunities for students to reason together. This is consistent with the second Mathematics Teaching Practice from *Principles to Actions*:

> Implement tasks that promote reasoning and problem solving. Effective teaching of mathematics engages students in solving and discussing tasks that promote mathematical reasoning and problem solving and allows multiple entry points and varied solution strategies. (Leinwand et al., 2014, p. 10)

The emphasis on reasoning and problem-solving is an important one. Many of us have been taught that having students work in small groups is a good idea. Simply putting students into small groups, though, is not sufficient to achieve the gains we desire for our students (Lee, Cortada, & Grimm, 2013). Group time is often spent on task management rather than on shared discussion and analysis of ideas. ELLs are often assigned passive roles as listeners or as scribes for those who take more active roles in the processing of ideas. Our approach is designed for ELLs to join their classmates as initiators of ideas and as partners in the analysis of complex challenges and ideas—but all of this is centered on providing good activities to promote students' reasoning.

The initial challenge teachers in our project experienced was a strong curricular focus on learning mathematical procedures rather than on developing a deep understanding of key mathematical concepts. Like many mathematics teachers across the U.S. (especially those at the secondary level) whose curricula focus mainly on the teaching and learning of procedures for answer-getting, they were responsible for moving quickly and efficiently through a tightly packed curriculum, following the

textbook order of topics, and spiraling back as needed when student performance failed to keep up with their curriculum pacing guide. As described by participants in our project, teaching often involved teaching mnemonic devices to help students remember things (e.g., the order of operations; the long division algorithm), rapidly checking the correctness of assigned homework problems, and designing worksheets for additional practice with procedures students seemed to not understand. Shifting their teaching focus on the quality of students' reasoning and understanding required support and easy access to new resources.

Where can we find activities that provide good opportunities for students to reason together? The website for the National Council of Teachers of Mathematics (www.nctm.org) can be helpful, and additional resources for finding activities are listed on the Resource page of the project website (http://stem4els.wceruw.org). One seventh-grade algebra teacher shared that she simply searches the Internet for "meaning-making activities for seventh grade algebra!" Others suggest looking at the extension activities located at the end of a textbook chapter. Using those at the unit onset, rather than at the end, can stimulate a lot of curiosity and thinking and can jump-start students' sense-making regarding the math concepts they will encounter in the unit.

What are some hallmarks of effective meaning-making activities? Most importantly, the activity or challenge or question should afford an opportunity for students to explore multiple ways of approaching and reasoning about the task (Smith & Stein, 2011). Additionally, the activity should be multi-layered. After coming up with many strategies or ideas, students could be asked to discuss together why each strategy works or to explain why they think some strategies are more efficient than others. Spiraling through the ideas at these deeper levels of analysis provides important opportunities to reason and to strengthen the language students need to explain their complex thinking.

One teacher we observed introduced a unit on polynomials with a sorting activity. The teacher had noted that students in past semesters seemed not to realize how important a difference exists among expressions such as $3xy$, x^3y *and* $3x^y$, and she wanted them to come to this realization through activity rather than through her reminders. Small groups of students were given a set of cards with different types of polynomial expressions, and were asked to collaborate in sorting them into categories and then justifying their categorizations. Although several students asked her if their categorizations were correct, or how many categories they should have, she responded with questions that probed their reasoning and kept them working toward clarification as a group: "I see you have these three things grouped together. Can you explain why? Do you all agree on that? No? Oh, you think something different? Can you explain your thinking? Interesting… see what you can all figure out together." She was pleased with the increased awareness and understanding her students had after this activity.

Creating good opportunities does not guarantee that students will step forward into those opportunities. The idea that teachers and classmates are interested in their ideas, rather than getting to the right answer quickly, will be new to some students. Others may come from backgrounds in which students are expected to learn silently

and to memorize what experts tell them. Others may have little knowledge of how to insert their ideas into the flow of an academic conversation, or have little confidence that their classmates will be patient with their slow or imperfect language. Both the Teacher Discourse Moves and Student Discourse Moves described below are critical to supporting students in taking important steps to engage with one another in the discourse of learning.

4.2 Teacher Discourse Moves to Facilitate and Deepen Students' Reasoning

Giving small groups of students an intriguing question to puzzle through together sets the stage for teachers to support students' growth in careful, critical thinking, and in effectively communicating their ideas. Teacher facilitation of students' reasoning involves activities such as posing purposeful questions and facilitating meaningful mathematical discourse (Leinwand et al., 2014, p. 10). The work always involves helping students listen to one another and think carefully about the ideas developing among them. Figure 1 shows the meta-cognitive framework of our six

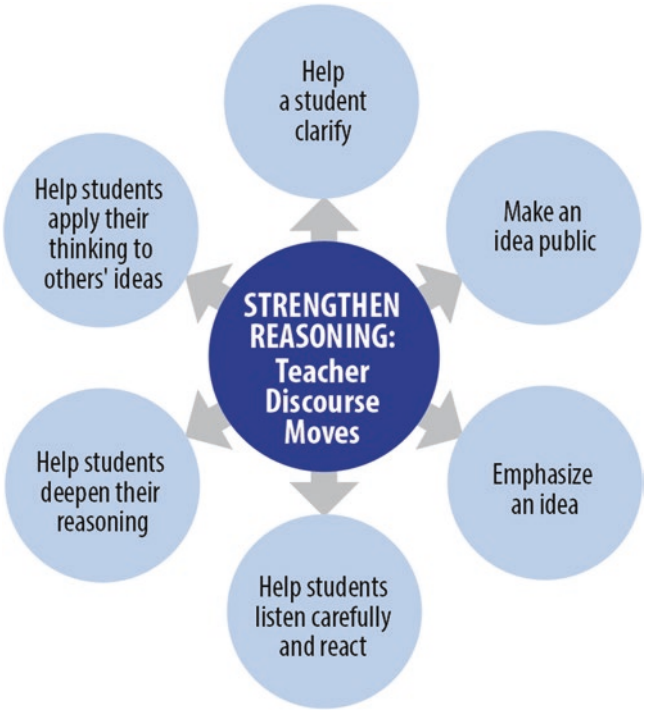

Fig. 1 Meta-cognitive framework for Teacher Discourse Moves

Teacher Discourse Moves; these strategies are used to probe and strengthen students' reasoning, to keep their ideas moving forward, and to keep students talking to one another. Teachers have identified this simple graphic as a helpful reminder of strategies they could use to stay out of the familiar "teacher as expert" mode and keep the responsibility for the idea in the hands of the students.

Table 1 displays linguistic examples of the Teacher Discourse Moves, written for students at three levels of English proficiency: beginner, intermediate and advanced. Most teachers found the examples in Table 1 useful initially to help them learn the Teacher Discourse Moves, but did not need them once they understood the Teacher Discourse Moves. Many simply enlarged and laminated the small graphic in Fig. 1 and kept it nearby as a reminder.

The Teacher Discourse Moves and their purposes are fairly transparent, but some elements deserve highlighting. Listed under *Help a student clarify an idea* is the hint to allow 20–30 seconds of wait time to elapse before giving a second prompt,

Table 1 Examples of Teacher Discourse Moves

Teacher Discourse Moves	Examples
Help a student clarify an idea	Provide individual thinking time and pair activities to help students express the "first draft" of their idea
	Charge student pairs with questioning and supporting one another until ideas expressed are understood
	Provide 10-20 seconds of wait time both before and after student responses
	"Can you show us what you mean?" "Can you draw that?" "Can you say more about that?"
Make an idea public and available for discussion	"Tell us more about what you're thinking."
	Revoice an idea to repair or model clearer language, but ensure that the ownership of the idea remains in the student's hands. "Did I say your idea correctly? Is that what you were thinking, or was it different?"
Emphasize an idea	Attend to all ideas, and be explicit about putting some on hold for later consideration.
	Re-broadcast generative ideas by revoicing, or by asking a student to paraphrase. This allows additional processing time for all.
	"That's interesting. Can you say that again for us?" "Will someone re-tell that idea for us?" "So, are you saying that…?"
Help students listen carefully and react	"Who can restate that for us?"
	"Who wants to explain the reasoning Group A used?"
	"How is that idea different from Mary's?"
Help students deepen their reasoning	"Can someone give me an example of that?"
	"How could we test that?"
	"What do we need to know more about now?"
Help students apply their thinking to others' ideas	"You look uncertain. What can you ask X to find out more?"
	"How does that idea connect to what Group A talked about?"
	"Which explanation is most like your group's? Talk to them and find out how they are different."

and to allow the same amount of time *after* a student has made a remark. We are asking students to think out loud. Thinking is hard and takes time, and putting complex ideas into words is not easy. Ideas rarely come out fully developed or clearly articulated the first time, even for the most experienced speakers. Waiting patiently for students to say more provides an opportunity for them to continue to explore their ideas aloud, or to state them more clearly, and this gives others additional opportunities to follow along and think it through with them.

Another important strategy that shows up under *Make ideas public* and *Help students apply their thinking to others' ideas* is the reminder, when revoicing a student's idea, to always check with the student to see if you have expressed the idea correctly. After all, it is the student's idea, and we want to make sure our revoicing does not change it, or steer the discussion in a different direction. We have observed remarkable examples of ELLs persisting in clarifying their ideas aloud in response to this humble question from a teacher, "Did I say that correctly? Try again, please. I'll try to do a better job of understanding." We need to build this same habit among our students, as well, so that they respect the integrity of one another's ideas and develop the patience and persistence needed for collaborative and respectful discourse.

4.3 Student Discourse Moves for Collaborative and Critical Thinking

When we present students with intriguing challenges and work to facilitate and deepen their reasoning, some will jump right in and others will hold back. Some students have learned to spit out correct answers quickly or to keep quiet if they cannot; some have not had much experience in explaining their thinking, or are uncertain how to word things so others will understand. But to activate students' collaborative thinking and discussion—the engine driving language development—we need to help students learn new ways of interacting. Students need strategies, support, and practice as they learn to examine issues and build new understandings together. A small set of Student Discourse Moves helps students learn to choose among seven choices they can make when an idea is on the table for discussion.

Just as with the Teacher Discourse Moves, the Student Discourse Moves have examples of language students can use to enact the moves, some of which are shown below in Table 2.

The teachers in our project with a high proportion of ELLs in the classroom taught one Student Discourse Move at a time. They posted a large copy of the graphic of all the moves (shown below in Fig. 2), referred to them as they came up in conversation, and gave students small copies of the language examples in bookmark form, one at a time. Some moves took longer for students to learn than others, but after a few months, teachers noted that all students were learning newly introduced moves pretty quickly.

Table 2 Student Discourse Moves

Student Moves	Examples
Tell and explain a new idea	"I think…"
	"The evidence for that is…"
	"Since both situations are similar, we could…"
Clarify an idea	"Say again, please."
	"What did you mean when you said…"
	"I wonder if what you're saying is…"
Restate or summarize an idea	"He said…"
	"In other words, …"
	"The suggestion was made that we…"
Compare ideas	"Same thing."
	"Our idea is better because…"
	"The other method would be a better test of …"
Support an idea	"Good idea because…"
	"Remember, in our book it said…"
	"The advantage of that method would be …"
Build on an idea	"Let's try it."
	"That's what we should do next."
	"That idea would help us figure out whether …"
Question or challenge an idea	"I don't think so."
	"But what about…"
	"Isn't there a more efficient way to…"

After an initial learning period, students experienced in expressing their ideas in English seemed not to need the language examples, but they were important supports for ELLs. Having easy access to them seemed to help ELLs speak more frequently and more confidently. It is important to make sure ELLs see the Student Moves only as examples and to remind them that there are many ways to say things. Teachers can leave some blanks on the page and keep a running list of additional examples to reinforce the generative rather than prescriptive use of these examples. We observed a wonderful interaction in one classroom when an ELL could not find his bookmark and another student reassured him, "There are lots of ways to say that. You could say…or…" This was one of several examples we observed of students learning language from and with one another.

Teachers have found that posting the graphic in Fig. 2 in the classroom serves as an ongoing meta-cognitive support. The idea that students are always responsible, every minute, for tracking the development of an idea and for being ready with a response to strengthen their own or the group's understanding is a new one for many students. Teachers can support students' integration of this framework of choices and their responsibility for action by being overt about the naming of both Teacher Discourse Moves and Student Discourse Moves as they take place. We have heard one teacher do this very playfully, "I like the way you moved that move!"

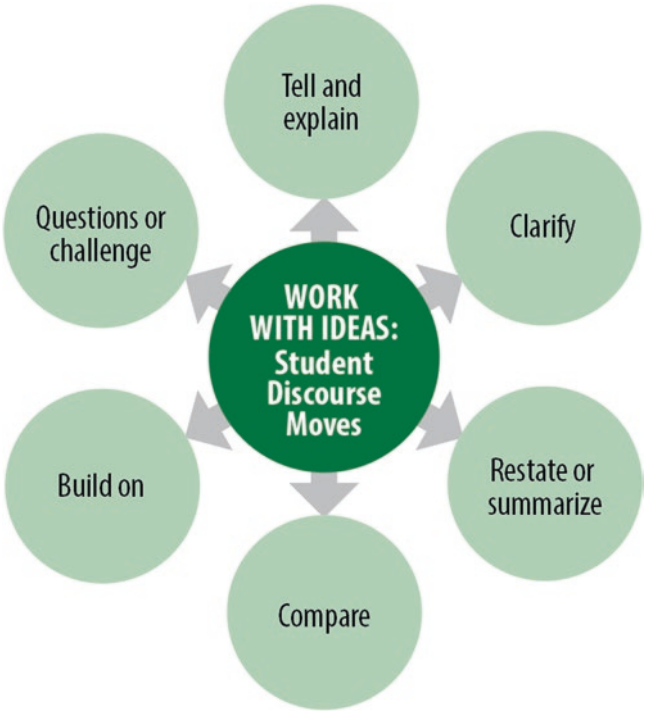

Fig. 2 Meta-cognitive framework of Student Discourse Moves

5 Conclusion

Moving to a discourse-centered pedagogy has provided many benefits to both teachers and students. For example, teachers have shared:

- "For the first time in 25 years, I'm certain that my students understand this. They don't need to memorize formulas or math jingles. They really understand the math." — seventh-grade Algebra teacher
- "Our ELLs are speaking up and offering ideas in ways they never did before. They feel smart now, and they feel proud, and they're willing to take risks with their language to share their thinking." — fourth-grade teacher
- "When I do my walk-arounds, I see 100% engagement in high-level math discussions. That's never happened before, and it's exciting." – principal in a participating school

The new landscape shaped by the CCSS Standards for Mathematical Practice call for changes from teachers and students. The emphasis on strengthening students' mathematical reasoning combined with the opportunity this provides for simultaneously strengthening the language effectiveness of the most rapidly growing group of students in K-12 schools invite us into new ways of structuring classroom activities

and interactions. Resources described in this chapter can mediate this change. Teachers and administrators are clear that using the Teacher Discourse Moves to facilitate students' opportunities to reason deeply and critically together has had a profound effect on students' mathematical understanding. Similarly, the use of the Student Discourse Moves has opened opportunities for ELLs to join the discourse community of their classroom, acting as initiators of ideas rather than simply responders. When ELLs' ideas are solicited and valued, their classmates show patience and perseverance in their efforts to comprehend ELLs and to assist them in their explanations, thus enacting the negotiation of meaning-making that drives language development for ELLs.

Reflection Questions

1. What participation structures do you most frequently set up and facilitate in your classroom—teacher to individual students, teacher to small group, student to student?
2. Are you giving equal follow-up and attention to everyone's ideas: ELLs and English-fluent students? Boys and girls? Students whose ideas are easy to follow and hard to follow?
3. What were some interesting or surprising student ideas you heard this week? Are you satisfied with the way you integrated them into the class work?

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A Framework for Improving the Teaching of Mathematics to Bi/Multilingual Learners

Kara Mitchell Viesca, Nicole M. Joseph, and Nancy L. Commins

Abstract To teach mathematics well to bi/multilingual learners, we propose that mathematics teachers should consider the following five elements: know the content, know the language, know the learner, engage the community and assess meaningfully. This chapter defines each of these elements, explores how they are put into practice, and shares the responses of teachers who have participated in online professional development organized around each element. By approaching mathematics teaching with these elements in mind, teachers can more effectively support high levels of learning and achievement for bi/multilingual learners across levels of English proficiency and grade levels.

1 Introduction

The framework for effective teaching and learning in mathematics classrooms presented in this chapter grows out of our work[1] to improve instruction for bi/multilingual students in the process of learning English. An essential component of the

[1] In 2011, the Department of Education Office of English Language Acquisition National Development Program funded eLearning Communities for Academic Language Learning in Mathematics and Science, or eCALLMS (PR Award # T365Z110177), focused on improving the preparation and education of content teachers to work with students in the processes of learning English. One of the major initiatives was to develop eWorkshops for practicing teachers to learn to work more effectively with the bi/multilingual students in their content classrooms. Our eWorkshops were developed to be inquiry-oriented, practiced based, multimedia online resources for

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framework is an asset orientation to students, their linguistic repertoires, their cultural orientations and their background knowledge. Though these students are often referred to as English language learners (ELLs) by schools and districts, we deliberately refer to these students as bi/multilingual learners due to the bi/multilingual nature of their lives. Our intention is to push back against the deficit labeling of students according to a perceived or real deficiency in English rather than according to who they are: bi/multilingual. We also strive with this label to help all teachers view the possibilities rather than the challenges these students present.

2 Approach to Teaching Mathematics to Bi/Multilingual Learners: Our Framework

Our framework focuses on five important aspects that teachers need to think about and develop the related expertise: Know the Content, Know the Language, Know the Learner, Engage with the Community, and Assess Meaningfully. Each of the areas is defined and discussed below.

2.1 Know the Content

The first step in being an effective mathematics teacher of bi/multilingual students is having strong content understandings. Generally, secondary mathematics teachers have strong content expertise; however, with new standards in place via the Common Core and other initiatives related to mathematics reform, most teachers are being asked to think about mathematics and teach it in ways that are potentially unfamiliar. For example, the Common Core Standards asks teachers to use the Standards for Mathematical Practice (SMPs) for teaching more conceptually, rather than procedurally. These standards focus more on "processes" such as connections, reasoning, communication, and representation. Consequently, we see it as important for teachers to deepen their understanding of content they are teaching multilingual students. To do this, mathematics teachers should examine standards, break them down and use a variety of resources to deepen, enhance and further their understandings. Teachers should also discuss and explore common student misconceptions.

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collaborative professional learning communities of teachers (Viesca, Hamilton, Davidson, & The eCALLMS Team, 2016). This effort (now the ICMEE project: http://cehs.unl.edu/icmee/) produced over 30 eWorkshops, several specifically for mathematics teachers. The quotes from teachers in this chapter are drawn from online discussions among teachers engaged in the eWorkshops.

2.2 Know the Language

In order for mathematics teachers to understand the language of mathematics and the linguistic demands mathematics tasks put on students, it is important to become familiar with the ways in which students are expected to use language to interact with and understand mathematical concepts. This means looking closely at the aspects of language that students use in the mathematics classrooms (structures, functions & vocabulary) and analyzing the language of the mathematics texts in use, as well as the language students are expected to produce.

2.3 Know the Learner

Lucas and Villegas (2011) argue that teachers of bi/multilingual learners need to know their learner's academic, cultural and linguistic backgrounds. We concur and suggest that teachers engage in a variety of approaches to accomplish this. For instance, we recommend interviewing one or two multilingual students about a mathematics problem. This provides an avenue to learn about the students' mathematical thinking, as well as their language abilities to express their underlying thinking. Specifically, after such an interview with a multilingual learner, consider:

- Did the student(s) have any mathematical misconceptions that need to be addressed?
- Are the misconceptions common to all students or specific to multilingual students?
- Could misconceptions be related to cultural differences rather than language differences?
- What language structures and vocabulary did the multilingual student(s) use to express understanding?
- What languages structures or vocabulary were missing? How can these be addressed?

Engaging in an interview and reflecting on it with these questions offers important insights about the learner. One teacher who took this approach shared, "I've learned over the years and with working with my ELL students now in 6th grade, to listen to what they say about the lesson being taught, and hear what they do know and do not know." Listening to students can have profound impacts in assisting your efforts to make strong instructional and curriculum decisions.

Get to know learners in a variety of ways: via interviews, questionnaires, conversations with families, etc. Equally important is knowing how to put that knowledge about learners into practice via strong planning, curriculum and instruction.

2.4 Engage with the Community

Engaging with students' families and communities is an important way to help contextualize mathematics learning as well as draw on local assets and resources that will support high levels of student learning. Students and their families and communities use mathematical concepts every day. Thus, teachers need opportunities to become familiar with students' every-day experiences. Considering the oral history traditions of many cultures, inviting a member of a student's family or community (potentially a church pastor, a storeowner, a youth coach, etc.) to tell their own life story as a foundation for exploring mathematics principles is an excellent method of engaging with the community. This can also provide opportunities to bring languages other than English into the classroom.

2.5 Assess Meaningfully

Assessing students meaningfully in a mathematics classroom where students have varying levels of English proficiency can be a challenge for many teachers. It is often easy to forget the way that language development intertwines with opportunities to express mathematical knowledge. Meaningful assessment practices are built on all of the other facets of the framework presented in this chapter about effective instruction for bi/multilingual students. By knowing the content, the language, and the learner and finding ways to connect with the community, it is easier to design both formative and summative assessments that will allow students to demonstrate what they know about the mathematics content whatever their level of English proficiency. When you have a clear sense of the distinction between the language demand and the mathematics content, you can see how students' content knowledge can remain hidden without language supports. Formative, linguistically responsive assessments allow teachers to learn more about students' mathematical thinking as well as language skills.

WIDA, a national consortium of states that provides resources for the instruction and assessment of bi/multilingual learners, has created English language development standards, assessments and resources to assist teachers in planning meaningful assessment. These WIDA resources help teachers learn about what students can do at various levels of English proficiency across grade levels and specifically in mathematics. The Can Dos descriptors explain how multilingual students process and use language for each language domain and level of language proficiency by grade level cluster. They also assist teachers in thinking about the cognitive challenge of tasks/assessments and how to design assessments with meaningful language supports. Table 1 provides an example of some (but not all) of the writing Can Do's for the 9th–12th grade cluster.

The Can Do resources from which this example is drawn are downloadable in both English and Spanish. Additional resources from WIDA include Speaking and

Table 1 Examples of can do descriptors (n.d) for 9th–12th grade

Level 1	Level 2	Level 3	Level 4	Level 5
Label content-related diagrams, pictures from word/phrase banks	Make content-related lists of words, phrases, or expressions	Complete reports from templates	Summarize content-related notes from lectures or text	Produce research reports from multiple sources
Provide personal information on forms read orally	Take notes using graphic organizers or models	Compose short narrative and expository pieces	Revise work based on narrative or oral feedback	Create original pieces that represent the use of a variety of genres and discourses
Produce short answer responses to oral questions with visual support	Formulate yes/no, choice and WH- questions from models	Outline ideas and details using graphic organizers	Compose narrative and expository text for a variety of purposes	Critique, peer-edit & make recommendations on others' writing from rubrics
Supply missing words in short sentences	Correspond for social purposes (e.g., memos, e-mails, notes)	Compare and reflect on performance against criteria (e.g., rubrics)	Justify or defend ideas and opinions	

Writing Interpretive Rubrics (2017) that are designed to document how multilingual students process and use language in the domain of speaking or writing for each level of English language proficiency. The rubrics are based on three criteria: linguistic complexity, vocabulary usage, and language control in grades K-12. By reviewing the rubrics and the Can Do descriptors, teachers can not only identify where students are at the moment, but also look ahead to the next level for ideas of where to move students. The Can Do resources are available by grade bands to work across content areas, including mathematics.

3 Theoretical Foundations of the Approach

Critical sociocultural theory and related instructional practices (e.g. Teemant, Leland, & Berghoff, 2014; Tharp, Estrada, Dalton, & Yamauchi, 2000) provide a major foundation for our work. Tharp et al. (2000) described five Standards for Effective Pedagogy based on sociocultural theory as capable of transforming teaching for excellence, fairness, inclusion and harmony. The five standards are:

- Joint Productive Activity (where teaching occurs through assistance and joint production between teachers and students),
- Language and Literacy Development (where language and literacy instruction is attended to across the curriculum),

- Contextualization (where explicit connections are made in teaching and curriculum to students' lives outside of school),
- Teaching Complex Thinking (where students are challenged towards cognitive complexity), and
- Instructional Conversation (where teaching occurs through dialogue).

The research conducted on classrooms where these standards are put into place shows positive learning outcomes for students, particularly bi/multilingual learners (e.g. Doherty & Hilberg, 2007; Doherty, Hilberg, Pinal, & Tharp, 2003). For example, Doherty and Hilberg (2007) found that teacher use of the standards effectively predicted student outcomes in reading, comprehension, vocabulary and spelling and that teachers who used the standards consistently had higher student learning outcomes. Studies in mathematics have shown similarly positive outcomes. For instance, Hilberg, Tharp, and DeGeest (2000) found that students instructed with the Standards for Effective Pedagogy had greater achievement on standardized tests than those who were not and also had an increase in their positive attitude towards mathematics as well as their enjoyment of it. More recently, Teemant et al. (2014) added an additional standard to these five that they termed "critical stance." While the original five Standards for Effective Pedagogy tacitly included elements of critical pedagogy (e.g. dialogic learning, collaboration, etc.), as an instructional model the five standards for effective pedagogy did not overtly focus on power relationships, student agency or exploring multiple perspectives (Teemant et al., 2014). This added standard focuses specifically on teaching to transform inequities and working with students to take leadership in transforming issues of inequity through democracy and civic engagement. It provides the underpinning of the mindset that mathematics teaching in linguistically and culturally diverse contexts must explicitly seek to connect the instruction to children's lives and address any inequities present in the mathematics classroom.

The rich work regarding culturally responsive/relevant teaching (e.g., Gay, 2002; Ladson-Billings, 1995) also provides a theoretical foundation for the practices shared here. Building on this work, Paris (2012) argued for growth from the stance and terminology of "culturally relevant" to "culturally sustaining." He argues that in order to truly value our multilingual and multicultural students, we should work to "perpetuate and foster—to sustain—linguistic, literate, and cultural pluralism as part of the democratic project of schooling" (p. 93). This perspective can assist you in designing and engaging in pedagogical approaches that value and sustain students' identities as well as assist in making students' in-school learning more relevant for their out-of-school lives.

Our work has also been grounded in the linguistically responsive teaching framework developed by Lucas and Villegas (2011), something we see as also providing the opportunity to sustain and expand linguistic diversity. This framework suggests the orientations, as well as knowledge and skills teachers of bi/multilingual students should have in mainstream content classrooms. Specifically, Lucas and Villegas argue that teachers need to develop sociolinguistic consciousness that includes the understanding of the connections between language, culture and identity, as well as

an awareness of the sociopolitical aspects of language education and use. They also suggest that teachers should value linguistic diversity and have an inclination to advocate for bi/multilingual students. In terms of knowledge and skills, Lucas and Villegas argue that teachers need to know about their bi/multilingual students' backgrounds, experiences and proficiencies, to be able to identify the language demands of classroom tasks, to be able to apply key principles of second language learning and to be able to scaffold instruction to promote bi/multilingual student learning.

Together these theoretical frameworks provide us with a strong base to consider the effective teaching of mathematics to bi/multilingual students that is sociocultural and critical as well as culturally and linguistically responsive/sustaining.

4 Implementation of the Approach

Each section below contains examples that highlight both activities that teachers have tried with their students, as well as how understanding and addressing each of the elements of the framework contributed to their growing ability to teach mathematics to bi/multilingual learners. They are drawn from the online collegial discussions of teachers who participated in the eWorkshops that utilized this framework.

4.1 Know the Content: Implementation

The Common Core Standards for Mathematics, when implemented with intentionality, push most mathematics teachers to an authentic place of reflection about their content knowledge. Gone are the days when a math teacher could prepare for class the night before because she was using a standard textbook that probably centered procedural learning. Common Core is asking students to conceptualize mathematical ideas, to make connections, and apply mathematical concepts to real world problems to prepare for twenty-first century careers as well as freshman-level college mathematics courses. The Common Core focuses on developing the critical-thinking, problem-solving, and analytical skills students will need to be successful; consequently teachers are having to acknowledge their own under-developed areas in different math concepts. When given a chance to reflect on her understandings in relation to ratios, one teacher commented:

> After reading the student misconceptions [exercise] I was aware that I myself have some of these issues. I have always struggled with math concepts and that is why I wanted to take this class. I have struggled the most with ratios because my brain has difficulty "seeing" the relationships and I get confused. When I read through the scenarios I was only able to understand the student's issues after reading the answers. I then went back and made my own charts and solved the problems and then I was able to see the problems. For myself, I am going to have to learn to solve the problems before I assign them so I can see where students might make mistakes. It is a timely process, but it helps me learn to teach it to students who struggle.

When the teachers we worked with were asked to dig deeply into the new mathematics standards, they all found the activity useful. One teacher commented:

> Coming from a generation of algorithm instruction only, the multiple approaches to learning ratios and proportions is a powerful ah ha. When I was first introduced to these approaches I was very uncomfortable using them for instruction. As I see how powerful these tools can be to struggling students I regret I did not get the same opportunity.

Overall, our work and teachers' responses to it suggest that there is great value in ensuring strong content understandings for teachers in the mathematics classroom as a foundation for their work with bi/multilingual students.

4.2 Know the Language: Implementation

One resource we recommend, grounded in the work of Dutro & Moran (2003), relates to *brick and mortar words*. They define "brick" words as vocabulary that is specific to the content and concepts being taught and "mortar" as words and phrases that are basic and general vocabulary that are useful for constructing sentences. An example of mathematics bricks would be multiply, integer, reciprocal, divisor, ratio and fraction; and mortar words might be explain, evaluate, prove, examine, represent, between, however, compare etc. Examine the following problems below to see if you can identify the brick and mortar words:

1. Of the students in Jonah's class, 1/2 have a pet cat. Of the students who have a cat, 4/5 also have a dog. What fraction of the students in Jonah's class have both a cat and a dog? *Simplify your answer and write it as a proper fraction or as a whole or mixed number.*
2. Dana knit a total of 6 centimeters of scarf over 2 nights. After 6 nights of knitting, how many centimeters of scarf will Dana have knit in total? Solve using unit rates.

Some of the brick words include half, centimeters, unit rates, and some of the mortar words include simplify and solve. Giving these problems to your students to capture samples of the language they use could give you an idea of the type of brick and mortar words they use to solve such ratio/rate problems. A group of teachers could also scale this activity to have several bi/multilingual students solve these problems from their different classes. Together, teachers could compare and contrast the language students are using to solve the problems and decide how to more effectively plan for re-teaching and future lessons on similar ideas. The results of both of these activities can be used in many different ways to learn about the language demand of mathematics classrooms as well as students' abilities within those demanding tasks.

Teachers could also teach polysemous words, words with multiple meanings inside and outside the math classroom. For instance, the word "table" is a word a bi/

multilingual student may be very familiar with outside of mathematics class as a piece of furniture, but inside of the mathematics class, it means something different. You can create a chart that students can fill in with the definitions of common words across different contexts. This could be done as a school-wide effort with teachers from different subject areas posting the chart and adding to it.

Another strategy is to provide sentence stems as students learn to talk about various mathematical concepts. Providing students with stems like, "How did you get _____?." "Why did you do_____?," and "What does _____ mean?" are helpful for students to have more tools to navigate challenging content.

In response to suggestions to analyze the language of the mathematics texts they use, as well as the language students are expected to produce, one teacher did the following:

> One of the things that I tried with the two students I pulled was to have them define and illustrate rate, ratio, unit rate and fraction. Then we used their illustrations and definitions to work on a few of the word problems. They each completed 4 questions and each one of their answers was correct. They discussed them with each other and actually used the language appropriately. We are going to create a math language notebook, where they can define and create illustrations and examples to remind them how to figure out problems.

Another approach you can use to help students match mathematical concepts to their vocabulary is graphic organizers (e.g., an adaptation of the Frayer Model, a concept definition model, and a definition model). Below, the teacher describes students' engagement in using graphic organizers designed to assist with the language demand of mathematics:

> I am a fan of breaking material down to its roots. So I enjoyed explaining this project to my [students]. Since they are very familiar with graphic organizers, they showed confidence after my directions. I had 4 groups with 4–5 students in each group. They are grouped so that there was a balance of various ELL proficiency levels and math skills levels. To begin, I let them choose two graphic organizers. I gave them the opportunity to choose two of the words that were in the [materials from our eWorkshop]. I then asked each group why they chose the organizer that they did. There was a fair mixture of the various organizers used. The most popular was the Frayer Model Adaptation graphic organizer. When asked why that was their favorite graphic organizer, the responses were because "it looked simpler," "I thought I could follow it easier," and "It was the easier one."

As you can see, teachers and students reported value in doing this work. Similarly, teachers who utilized sentence stems for the first time reported having the opportunity to understand more about students' conceptual understandings regarding mathematical concepts because students had the necessary linguistic tools to discuss their thinking.

Teachers' felt they gained confidence in implementing some strategies and their abilities in this part of the framework: Know the Language. The teacher above who tried out the activity using different graphic organizers reflected on the lesson as follows:

> As I observed my 18 students, I saw an unfamiliar sight. The stronger ELL/math proficient students were not the only ones participating. I had a variety of skill levels participating in

> the activity. When I refocused the class I asked for them to share their thoughts. The majority of them found this activity "fun and easy." I also asked if it was helpful? The responses I received were that it was helpful. They were able to focus on the vocabulary terms instead of "just numbers." I definitely see myself using these graphic organizers in the future. It was a great way to break down the vocabulary for ELL students as well as low proficient math students. Without knowing the correct vocabulary, it is difficult to grasp the concepts. After the activity, I continued our scheduled lesson and noticed my students using more of the vocabulary words that were part of the activity.

4.3 Know the Learner: Implementation

Consistent with the Contextualization standard from the standards for effective pedagogy (Tharp et al., 2000), students and teachers can work together to take their knowledge of one another to situate new mathematical learning in everyday life situations. An example of this is in our work with teachers around teaching Ratios and Proportions to bi/multilingual students. Teachers were asked to explore everyday uses of ratios with their students. One teacher described this work:

> I was running around my house taking pictures on my phone the other night when everyone else was in bed. I'm trying to figure out a way to have my little group take their own pictures so we can make a real-life representation poster for examples of fractions in different contexts.

This teacher recognized the fractions that existed all around her in her home and wanted to help students find a way to recognize this as well. Similarly, another teacher did an activity we suggested related to the use of ratios in everyday life and described the following:

> They were not to [sic] sure what they use everyday that is a ratio, so what I did was I went through a store advertisement, and cut out everyday items most household use, such as toilet paper, laundry detergent, soda and cereal. I broke the kids up in 2 groups, they had to ask the members of their group which brands did their families [use] and compare. It was a fun activity, and it was something that the students were familiar with so they were able to catch on fast.

This kind of activity is most successful if you know your students well and know what stores they shop in to be sure to bring in relevant items/brands. This teacher reflected on how many of the students did not use the brands from this particular advertisement—that most of the students reported using "Great Value" from Walmart. Such information can further inform your efforts to contextualize learning and getting to know your students well.

Another way you can get to know your students well and translate that into effective curriculum and instruction is based on the lesson plan template included in Appendix A. This lesson plan template explicitly asks you to consider each element we have identified (know the content, know the language, etc.) and utilizes ideas and resources from WIDA (https://www.wida.us/) and Understanding by Design

(Wiggins & McTighe, 2005) to support that work. In order to most successfully utilize this lesson plan, you truly do need to know your students in order to design effective instruction.

4.4 Engage with the Community: Implementation

Seeing connections between the local community and math lessons takes intentional thinking on the part of the teacher—she must know her content, know her students, and know the surrounding communities. One teacher used a community garden grid to help her students think about the importance of fractions for planting in a garden. She described the following:

> I explained to my students that grids are very helpful to portion out fractions. I also explained that in the agriculture fields, grids could be used to portion out the land to plant crops. Toward the end of the video, they said additional ways to use grids. Each group chose 4–5 vegetables to plant. I encouraged them to use vegetables that they were familiar with. The group that I recorded chose jalapenos, habanero peppers, cucumbers, corn and tomatoes. I also allowed each group to choose 2 of the 3 garden grids provided. They chose a grid with 12 portions and one with 6 portions. The group then worked together to decided what fraction of each vegetable to shade in their garden grids. After each group portioned out their own vegetable garden grid I had them switch grids with another group to record their fractions.
>
> A success that I am proud of is that no matter what their language or math proficiency was, they all seemed confident with this activity. Each person participated and looked comfortable with the fractions. When they switched grids to record other groups' fractions they all were correct with their answers.
>
> A challenge I observed was that no group chose the more challenging garden grid. This grid was not divided into equal parts, it had some sections that were larger than the others. I intend to do this activity again next week but only allowing them to use the more challenging grid to practice adding fractions to find the [lowest common denominator].

An extension of this activity into the community and with families could include a local gardener talking to the class about how they plan their gardens and potentially doing a more complicated grid collaboratively with the class reflective of their own garden. This could also be an opportunity to include a family or community member in instructional spaces who is not confident in English. They could use their most confident language with students who speak that language if there are opportunities for other students to either engage with a different community member or have some translation opportunities for them to learn from the community member communicating with the students in a language other than English as well. This approach could appear to take a lot of effort and time that may seem to take away from direct math instruction; however, because these activities deepen students' connections and conceptual understandings it is time well spent over the long run. Both contextualizing learning to meaningful contexts outside of school and including the local knowledge and resources like family and community members is an excellent way

to support quality mathematics instruction for bi/multilingual students. Further, in secondary mathematics classrooms where the mathematics is rather complex, at times returning back to basics and building or extending foundational pieces of mathematical conceptual thinking can help students gain the skills, confidence and resources to launch into more complex mathematical practices.

4.5 Assess Meaningfully: Implementation

We have encouraged teachers to use the WIDA Can Do descriptors described above as a pre-assessment to learn about their students. One teacher discussed this saying:

> As I explored pre-assessment for multilingual learners, I was pleased to see that these documents were very positive, focusing on what a pupil 'CAN DO' as opposed to what they have not yet achieved. I feel this kind of assessment would have a positive effect both on pupil and teacher. I think it is important to remember that multilingual children have potentially come from a different background or culture, where there may be different expectations in education. By carrying out a pre-assessment which recognizes this, it is a way of being subjective and inclusive for all learners.

Similarly, another teacher noted the value of using the WIDA Can Dos:

> Also, looking at the WIDA CAN DO descriptors, we are able to adjust some of the ways we assess students, to meet the multilingual learners where they are at in their language development. I may be asking a student who understands the content, to show me that on an assessment that is too difficult for their language level, even though they may have grasped the concept. Using the CAN DO's can help us as educators to meet our multilingual students understanding with the types of ways we should be assessing that understanding.

In addition to the value that thinking about language proficiency offers when working to meaningfully assess bi/multilingual students, we also suggest teachers explore how other aspects of classroom practice can provide meaningful insights into students' content knowledge and language levels. One teacher discussed this saying:

> What resonated with me the most while going through the [eWorkshop section], in regards to assessing our multilingual learners, for one was how many ways we assess students, but we may not always use those to assess their learning progress. Sometimes a student may show understanding on a formative assessment during a lesson, but may not be able to show that same understanding on a different type of assessment. I think at [name of school], we have many types of formative assessments where students can show their understanding, but we may not look at them as ways of assessing, but more ways of teaching. If I start to look at these different teaching techniques as assessments, it seems like I will have more ways to know where students are at in their understanding of a concept.

In this discussion that followed this teacher's comment, a colleague agreed with him and further discussed ways to expand assessment practices. One teacher focused on differentiation and mentioned:

> It is a good reminder that assessments should be differentiated. I see a lot, in my classroom, that students might be able to verbally explain something, but cannot write it down. It is discouraging to see a student that I know knows the answer, but struggles with the assessments at the end of the units. It is discouraging for both me and the student, and as you said, it lowers their confidence. It is important to assess students at their level of ability.

Finding ways to assess multilingual students via multiple modalities is an important aspect of meaningfully assessing students. This can be accomplished via differentiation, multiple types of assessments as well as multiple formats of assessments demanding different types of language skills (reading, speaking, listening and writing). Teachers can create a fairly comprehensive perspective of students regarding both their content knowledge and English language development.

5 Conclusion

The five elements presented in this chapter each provide entryways into strengthening our teaching of bi/multilingual learners. Inclusive learning theories undergird these elements and provide ways to see the strengths of bi/multilingual learners. The five elements' usefulness is borne out by the positive responses of teachers who have sought to integrate them into their teaching. For teachers just beginning this journey it is important not to become overwhelmed with trying to do all five elements at once. For example, you might begin by developing and practicing some strategies in one of the first three areas: know the content, know the language, or know the learner. Overall, by approaching mathematics teaching with these elements in mind, you can more effectively support high levels of learning and achievement for bi/multilingual learners across levels of English proficiency and grade levels.

Reflection Questions

1. How do these five elements relate to your current approach in teaching mathematics to bi/multilingual students?
2. What strengths do you already have in these five areas?
3. What are potential areas of personal growth in these five areas?

Appendix A

Mathematics Unit/Lesson Plan Template

GRADE LEVEL:
UNIT/TOPIC:
MATHEMATICS STANDARDS ADDRESSED (Common Core):
STANDARDS FOR MATHEMATICAL PRACTICE ADDRESSED:
ESSENTIAL QUESTIONS (ENDURING VALUE BEYOND SCHOOL):
BIG IDEAS:
POTENTIAL LITERACY CONNECTIONS:

Cognitive Function:
(What is the "thinking process" involved? i.e. COUNT, EXPLAIN, CALCULATE, EVALUATE, ANALYZE, COMPARE/CONTRAST, DESCRIBE)

DOMAIN: listening, speaking, reading, writing	Lang. Prof. Level 1** **Entering**	Lang. Prof. Level 2 **Emerging**	Language Proficiency Level 3 **Developing**	Language Proficiency Level 4 **Expanding**	Language Proficiency Level 5 **Bridging**	Language Proficiency Level 6 **Reaching**
	Topic-Related Language: (With which grade-level words and academic language expressions will all students interact?)					

**What goes inside of these boxes will depend upon which DOMAIN you choose. These will be the indicators or Model Performance Indicators (MPI) which gives examples of the LANGUAGE with which your students may engage during your lesson and or assessment. For additional support on filling out this part of the template, see examples of mathematics lessons in the 2007 & 2012 WIDA framework

INSTRUCTIONAL SUPPORT: Which support is necessary for students to <u>access</u> the

Sensory Supports	Graphic Supports	Interactive Supports
Real-life Objects Manipulatives Pictures & photographs Illustrations, diagrams, & drawings Models & figures	Charts Graphic Organizers Tables Graphs Number lines	In pairs or partners In triads or small groups In a whole group With the Internet (websites) or software programs In the native language (L1) With mentors

STRATEGIES FOR ASSESSMENT

How might I use varied strategies (listening, speaking, reading, writing) to have my multilingual students demonstrate their competence of the mathematics' content? What will be the different activities (formative) and projects (summative) that my students will demonstrate what they know and can do?

POTENTIAL COMMUNITY CONNECTIONS

How might this learning translate into something meaningful for your students outside of the school environment? How might the students take their learning and contribute to a better community?

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Culturally Supporting Latinas and Korean Girls in Mathematics

Woong Lim, Kyeong-Hwa Lee, and Paula Guerra

Abstract This chapter discusses strategies to create culturally and linguistically sensitive secondary mathematics classrooms. A teaching scenario of a review activity to solve Algebra 2 problems is drawn to illustrate four practices for promoting English Language Learners' thinking, reasoning, and participation in classroom discourse. Teachers can create a safe, interactive learning environment for English Language Learners through cultural sensitivity and a positive relationship with English learners, their families and communities.

1 Introduction

The essence of engaging English Language Learners (ELLs) in mathematical discourse lies in eliciting their thinking and reasoning to build rich classroom discussions. A healthy and caring discourse community in mathematics classrooms can foster ELL students' academic and social development, as well as generate a productive mindset for mathematics learning. In this chapter, we outline a culturally and linguistically sensitive approach, providing four specific strategies and discussing the theoretical roots of the cultural and pedagogical contexts of Latinas and Korean girls. Although we make recommendations for teachers to consider, which

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specifically target Latinas or Korean girls, we caution the reader against making generalizations about just one group or the other (or all members of either group).

Despite this narrow focus and the risk of overgeneralizing, it is increasingly important to create spaces for sharing the voices and experiences of immigrant students collectively as well as individually. Along with gender bias in today's classrooms, language difficulties from social and academic communications are compounded for female immigrant students in the U.S. educational system. Therefore, it is important for teachers to be sensitive to the subtle ways in which cultural elements of classroom interactions can impact ELLs' (especially girls') mathematics learning.

2 Approach to Teaching Mathematics to ELLs: Culturally and Linguistically Sensitive Practice

For secondary mathematics teachers seeking to teach ELLs, we suggest four classroom strategies that tap into the culture and language of ELLs:

2.1 Know What to Expect from Your ELLs, and More Importantly Know How to Motivate Them to Persist

Teachers Should Set High Expectations and Make Extra Efforts to Discard a Deficit Model of Student Ability Hispanic female students do sense teachers' negative stereotypes regarding their academic potentials, and such awareness of negative stereotypes can diminish motivation or engagement in academic work. This in turn can cause Latinas to disengage from classroom activities and ultimately undermine their academic achievement. It is important to reflect on the types of supports that can be offered to immigrant Latina students in the United States. Latinas will achieve as they are expected when teachers have a meaningful relationship, provide appropriate support, and maintain high expectations for them. What we mean by high expectations is that teachers provide instruction in which Latinas are expected to perform just like any students in the classroom, including their bilingual peers with different ethnic backgrounds. To appropriately support this, the teacher maintains mathematical complexity but offers ways to help students understand tasks while recognizing various ways to communicate their mathematical understanding.

Teachers Should Be Clear About the Importance of Active Learning and Find Creative Ways to Engage the Girls in Classroom Discussions The conservative nature of teaching in the Korean classroom imparts on Korean students a traditional way of learning mathematics. Students will sit quietly and take notes to demonstrate their respect for the teacher. As a result, Korean students (especially girls) may

appear to be too reserved to ask for help or communicate their understandings to the teacher since they are afraid to demonstrate their struggles or faults. Female Korean immigrant students who are used to the demand "quiet down and focus" may show similar traits in the U.S. classroom (Kao, 1995). From the U.S. teacher's perspective, the quiet female immigrant student may come across as a composed or precocious learner who is always on task. However, we caution that due to language barriers, as well as didactic teaching with few opportunities for discourse in the classroom of their home country, these immigrant students may still choose to be "quiet" in the task of explaining their conceptual understanding and articulating their knowledge.

As mathematics teachers support immigrant students in making a successful transition from rote learning to more meaningful learning, it is important to foster a safe and supportive learning environment and to build a learning community in which students develop learner agency and empowerment through engagement in meaningful learning experiences. While it is important to acclimate students to the culture of conceptual and meaningful learning, the teacher should seek a balance between various learning mindsets and diverse learning strategies in the classroom. Though rote learning should not be the goal of classroom instruction, the skills built through drill-and-practice can be leveraged as building blocks towards more meaningful learning. With this in mind, teachers should implement learning activities that balance the constructivist and behaviorist components of the learning process. Teachers can then gradually increase the constructivist components (see Jaworski, 2015) as immigrant students build on success with drill-and-practice so that students begin to find success in more meaningful learning through collaborative or inquiry-based activities.

2.2 Understand the Struggles in Mathematics and Provide Appropriate Support

Teachers Should Discard Gender Bias and Implement Rigorous Problem Solving High school Latinas experience barriers such as lack of financial and language resources, negative peer influences, and discrimination from teachers and peers (McWhirter, Valdez, & Caban, 2013). Researchers have documented teachers who questioned boys about their thinking and strategies for problem solving, but asked girls only lower thinking skill questions (e.g., recalling number facts or formulas) (Robnett & Leaper, 2013). It is reported that some teachers perceive boys who do poorly on tests as "smarter," citing "not engaged, uninterested, or bored" as a reason for the boys' struggles; in comparison with academically successful girls, who in the teacher's view are not necessarily smart, but *hard working* (Salazar, Hidalgo, & Blanco, 2010).

Teachers need to be aware of gender bias when they reflect on the success of boys and girls in mathematics. Teachers should discuss this with colleagues as well as look for strategies to overcome the bias. For example, they may engage in a community of teachers to share views and ideas to promote Latina's learning. This

process could be further improved by having a peer review of teaching with the specific goal of identifying gender bias during mathematics instruction. For example, some teachers may rely on a limited range of participation structures (e.g., calling on boys too quickly after posing a question or shaming silent girls who are not aggressively getting the teacher's attention).

The promotion of gender equity at home is an important factor for Latinas' academic success, so teachers need to consider the inclusion of parents in their effort to eliminate bias. Further, teachers could create opportunities not only for girls to see what other girls and women in general are capable of and can achieve in STEM-related careers, but also to provide the same kind of insight for parents.

Teachers Should Help ELLs Connect Between School Mathematics and Life Korean students often adopt a mathematics mindset of developing concepts through the routines of accepting concepts and solving exercise problems with the teacher as the expert. They equate their learning of mathematics to sharpening their math skills to excel in exams and valuing exam-based contexts, rather than engaging in learning to make connections to mathematics in real life. Given this classroom culture in their prior educational experiences, Korean girls may initially struggle in a U.S. mathematics classroom focused around context-based activities, building meaning, and exchanging ideas to develop knowledge. They may not respond positively and productively to mathematics instruction that seeks to relate mathematics to real-world contexts, with tasks promoting application-oriented sense making in the context of the real world. Korean girls may believe that mathematics instruction should be based on facts, procedures, or abstractions confined to the textbook. These students may find it uncomfortable to participate in classroom activities encouraging students to share their understanding, especially with a goal to connect the knowledge of school mathematics to the real world. Overall, this concept of mathematics learning in their home country influences students' perception of mathematics teachers as authority or content expert figures who control their learning (Wang & Lin, 2005).

Given this, teachers should use contexts and real-life problems that draw from sociocultural and/or environmental contexts to which students relate (i.e., an ethnomathematics curriculum). The mathematical skills that students should learn in school are not so much the outcome of the rigid abstract and logical cognitive structures of mathematics, but more of a combination of knowledge, skills, and experiences developed through social and cultural experiences (Boaler & Greeno, 2000). In this regard, we recommend U.S. mathematics teachers (1) use curricular materials that connect mathematics and culture evident in students' cultural and lived experiences and (2) engage immigrant students, as well as their English speaking peers, in a collaborative task of analyzing various dimensions of mathematics in immigrant students' cultures, alongside the U.S. culture, through ethnomathematical perspectives.

2.3 Reach Out and Increase Communication with ELL Families

Teachers Should Collaborate with Parents to Help ELLs Develop a Sense of Connection Between Home and the Classroom From the Latinas' experiences and their voices, research has stressed the importance for the school to serve as an extension of *el hogar* (the home) (Vega, Moore, & Miranda, 2015). Latina students can benefit a great deal from connecting their class and home as a big family rather than separate or conflicting communities. Latina/o children in the U.S. often find that success in school is linked to a responsibility they owe to their parents (Fuligni, 2001). Getting to know Latina/os students and their families can help teachers understand the expectations the family has set for members of the family, and this will help the teachers understand the level of commitment and enthusiasm for learning within the families. Home visits, for example, are an excellent way to create positive relationships with Latino families and communities. Another strategy is engaging with the family in the community (e.g., shopping in a student's family-owned store). A strong and lasting relationship with the family can help teachers develop a strong understanding of the ways Latina students act and participate in class.

In light of the need to connect home with their school success, teachers should engage Latinas in mathematics learning by bringing the community to the classroom, connecting mathematics to their social concerns, and showing both students and parents that the math they already do at home matters (Civil & Planas, 2004). In addition, we encourage teachers to invite the Latina students who teach their siblings mathematics at home to share their tutoring strategies with the class and involve them in peer tutoring in the classroom (Guerra & Lim, 2017). In such a way, Latinas have meaningful opportunities to connect home and school, develop leadership skills, and feel that they are valued in the classroom community.

Teachers Should Be Aware of Confucian Beliefs and Their Influence on Education and Attend to the Nuanced Roles of Parents in the Korean Family One distinct characteristic of the educational system in East Asia (i.e., China, Japan, and South Korea) is the people's passion for education (Leung, 2006). This demand for education largely stems from the traditional Confucian belief of human development through education and their support of the educated elite as the governing class in society. This system ensures that parents are more interested in their children's class rank and college admission than other outcomes of education.

Research claims that traditional East Asian fathers may play a limited role in the everyday rearing of their children (Ho, 1987). Yet, East Asian daughters may still be very sensitive to their fathers' views on their mathematical abilities and career choices, even going so far as to abandon their interests in mathematics to please their fathers; this is especially true when students encounter greater success in other academic content areas than mathematics and science (Lee & Sriraman, 2012). In contrast, East Asian mothers are reported to often show extreme passion for their

children's education, using more strict or demanding measures to push their children to be academically successful (Guo, 2013; Park, 2007). As a result of the heavy emphasis on academic achievement through competition, daughters face enormous amounts of academic work and a lack of rest; these factors have contributed to a high degree of academic stress (Panelo, 2010).

Although parents and teachers may hold different views on the principles and goals of schooling, U.S. mathematics teachers can engage in intercultural communication with parents by (1) valuing the parents' passion towards their child's education as well as (2) recognizing the parent's interest in affording their child high quality, pre-college education. After fostering mutual understanding with parents, the teacher is better positioned to talk to parents about new and different educational opportunities in American classrooms and to seek their support, which should enable the teacher to further impact student learning and development in social and emotional skills, alongside their academic learning.

2.4 Create a Multilingual Climate in the Classroom and Tap into Various and Alternative Mediums of Communication

Teachers Should Encourage Multiple Ways to Communicate Mathematical Ideas It is important to afford Latina students (or any ELLs) with a variety of tools, including the Spanish language, to communicate their understandings in mathematics discourse. As ELLs engage in secondary mathematics tasks requiring high cognitive demand, it is critical for the teacher to tap into various linguistic and non-linguistic resources including pictures, symbols/signs, and gestures to increase mathematics communication in various settings of discourse (e.g., small groups, whole group, pair sharing). More importantly, teachers should create various venues for mathematical communication in which ELL students are not ashamed due to their English language proficiency, but instead have the opportunity to use their linguistic and cultural resources with a sense of pride.

ELLs in the U.S. may want to make up words, for example mixing Spanish and English. Students may get confused by words with mathematical meanings different from everyday meanings (e.g., "degree" as either *la licenciatura* or *el grado*; "table" as either *la mesa* or *la tabla*); homophones could also confuse students. In response, we recommend the practice of teachers re-voicing students' statements (see O'Connor & Michaels, 1993). Through this approach teachers validate students' mathematical ideas first and then encourage students to adopt more appropriate terms in communication. Other strategies include writing important mathematical terms on the board when students speak the words, enunciating clearly, and simplifying complex language (not the mathematical ideas) for clarity.

Teachers Should Be Aware of How Students' Home Language Can Impact the Communication of Mathematics in English The Korean numeration system is a decimal system where the written form of a number specifies the number of units in

each base. Korean numbers have a corresponding word for each digit 0–9 and powers of 10. For example, the number 348, which reads *sahm-baek-sah-sip-pal* in Korean, can literally be broken down into the units *sahm* which is 3, *baek* which is 100, *sah* which is 4, *sip* which is 10, and *pal* which is 8. Korean students are known to effectively develop number skills in early childhood, for the most part, owing to the reinforcement of the conceptual knowledge of place value through the numeration system (Miura, Kim, Chang, & Okamoto, 1988). By contrast, the names of English numbers over 10 do not indicate place value clearly, and some number words for teens do not build from digits 0 to 9. As a result, Korean students may need additional support translating numbers to English.

Numeration is an important aspect of students' mathematical thinking and reasoning; therefore, U.S. teachers should explore various number systems derived from different cultures and civilizations. In the case of Korean numeration, we recommend that the teacher implement wait time and be flexible with student mistakes when Korean immigrant students are verbalizing numbers, especially in a whole group discussion setting. For example, the teacher can encourage Korean immigrant students to write down numbers before speaking the numbers. In addition, the teacher can demonstrate appropriate strategies to share mathematical work with a focus on verbalizing thoughts and strategies instead of reading numbers in the solution.

3 Theoretical Foundations of the Approach

We draw upon two theoretical frameworks to guide our understanding of ways to engage ELLs in mathematical discourse: (1) the principles for equitable mathematics teaching practices for English Language Learners (Moschkovich, 2013) and (2) ethnomathematics (D'Ambrosio, 1985). Together, these frameworks point to culturally competent teacher practices that attend to a variety of resources ELLs use to communicate mathematical ideas and promote the participation of emerging bilingual students in mathematics discourse.

The principles for equitable mathematics teaching practices for English Language Learners (Moschkovich, 2013) are a set of research-based principles and guidelines to support ELLs' engagement in rich mathematical activity and discourse. This theory is grounded in the view of mathematical language as discourse, consisting of syntax, organization, the mathematics register, and discourse practices. Moschkovich's (2013) recommendations for mathematics instruction for ELLs include: (1) Focus on students' mathematical reasoning rather than English language accuracy; (2) Focus on providing opportunities for students to engage in reasoning about mathematical tasks and communication instead of focusing on accurate vocabulary; (3) Support students in engaging in the complex and various mediums of communication including "objects, pictures, words, symbols, tables, graphs, oral, written, receptive, expressive, textbooks, word problems, explanations by students or teacher, exploratory talk, expository talk, and presentations to teacher/peers or by

teacher/peers" (p. 50); and (4) Students should use all linguistic resources including home languages, everyday language, and nonstandard English to engage in learning in the classroom.

Next, ethnomathematics (D'Ambrosio, 1985) is a framework that highlights the interrelated nature of culture and mathematics, with the view that mathematics is a *cultural* product and that cultural groups interpret the environment and apply their mathematics to solve problems. This perspective has helped to frame *culturally responsive mathematics teaching*. Culturally responsive mathematics teaching draws upon students' language and cultural assets, embraces different ways of knowing, and engages ELLs in the classroom community through their languages and intellectual resources. It also enables mathematics teachers to shift from perceiving mathematics as a neutral subject to a more multicultural perspective that reflects students' culture, language, and socioeconomic realities.

Together, these frameworks foster a productive, curious, and engaging mathematical mindset in students. We hold a vision of inclusive and culturally relevant classroom discourse, recognizing the complexity and importance of supporting ELLs as they engage in mathematics discourse (Moschkovich, 2010).

4 Implementation of the Approach

To illustrate our culturally and linguistically sensitive teaching approach in the secondary mathematics classroom, we share a teaching scenario. This scenario features a review activity posing four Algebra 2 problems on solving quadratic equations, rewriting a quadratic function from the standard form to the vertex form, drawing a graph of a quadratic function, and solving a quadratic optimization problem. The teacher engages students in small group work and then facilitates a whole group discussion. The four problems are shown in Fig. 1. We discuss the teacher's ways of implementing each strategy.

Strategy 1: Know What to Expect from Your ELLs, and More Importantly, Know How to Motivate Them to Persist in Learning Mathematics

With Latina ELLs, teachers should set a high expectation. For example, the teacher may state "I know you will get to finish all problems. You did a great job with completing the square method to write a vertex form last week, remember? When you get stuck, let me know. I am happy to help you, but you can solve these problems on your own and you can do it." As you encourage Latinas to engage in challenging mathematics, be sure to be specific about their strength and leverage it to motivate them to move forward. When assigning problems, make sure they have a range of difficulty (from easy to hard). It may help to indicate the level of difficulty in advance and be clear about wording. For example, you can explain that a "hard" question involves complex procedures and takes longer, and that a "challenge" question is hard and may need inventive strategies. With the challenge problem example in Fig. 1, ELLs may appreciate going over the meaning of the term

Instruction: Solve the assigned problems. Be sure to explain how to arrive at the answers. (You may be asked randomly to present your solution.)

1. (*easy*) Solve $-x^2 + 3x + 40 = 0$ (Show at least two methods.) x = ? or x = ?
2. (*hard*) Find the vertex of $f(x) = -x^2 + 3x + 40$ (Show at least two methods.) V = (?, ?)
3. (*important*) Sketch a graph of $f(x) = -x^2 + 3x + 40$.
4. (*challenge*) You want to sell your artwork for $10 each. One hundred twenty people are interested in buying a piece of your art. Let's say for every $2 increase in price, there are 15 fewer people willing to buy the art. What selling price will produce the maximum revenue, and what will be the maximum revenue? (Note: Revenue = selling price times the number of art items sold)

Fig. 1 Four problems used in the teaching scenario

"revenue" or the phrase, "there are 15 fewer people willing to buy the art." The teacher may illustrate the meaning by stating, "you sell at 12 dollars, now 85 people are going to buy, and you sell at 14 dollars, then 70 people are buying." The teacher may use simple words and even try to use just numbers (preferably in the students' first language) to help students catch a number pattern related to the phrase, but it is important to let the girls figure out how to set up algebraic expressions or build a table to represent the situation.

With Korean girls, the teacher can provide support in concrete yet subtle ways (e.g., protocols or routines including wait time) that promote participation. The teacher can share a list of questions in advance so that the girls are able to prepare their answers just like they would solve problems, or arrange participation prior to the whole group discussion. For example, the teacher may post a list of discussion questions on the board such as "What did you do differently with $-x^2$, instead of x^2, to solve a quadratic equation?"; "What are the points of interest to draw an accurate graph of a quadratic function?"; or "How did you translate the situation of the word problem into mathematical sentences?"

With the opportunity to craft responses beforehand, the teacher can afford these students the meaningful experience of developing language skills in the mathematics classroom. When the teacher identifies a good solution from a student who may struggle to explain it verbally, it is important to arrange participation while walking through the classroom. For example, the teacher may tell the student, "Would you tell the class about finding the vertex without using the formula $h = -b/(2a)$ if possible? Let me know when you're ready. I thought it would be nice to share your ideas with the class." It is important to promote the student's mathematical work and support her emerging language skills. The teacher should first ask the student to show her work to the class and read the mathematics (with gestures if relevant); then the teacher can add appropriate comments. In doing so, be sure to credit the student's mathematical work so that she feels proud and gradually improves her English from the language the teacher uses to explain the work: "Do you see what Young-sook did? She is trying to show us the x number of the vertex is the midpoint of the x coordinate of the x-intercept. That is really neat."

Strategy 2: Understand the Struggles in Mathematics for Each Group of ELLs and Provide Appropriate Support

With Latina ELLs, a male teacher can invite a female colleague (or vice versa) and demonstrate various ways to draw a graph of a quadratic function. We recommend that the co-teaching exemplifies a productive discourse for the class along with various peer interactions among students—especially between boys and girls—for practices such as explaining, listening, comparing, clarifying, challenging, restating, extending an idea, and supporting an idea with different examples. In doing so, the teacher can foster students' metacognition as well as create opportunities to engage Latina girls who look for ways different than the boys. The teacher may encourage the girls to think outside the box and promote creative thinking when it emerges during the discussion. For example, one Latina may notice that the concavity, the vertex and two zeros of a quadratic equation can result in drawing a successful quadratic graph thanks to the symmetrical property of quadratic graphs. Some may draw a graph using graphing utilities and then work backwards to figure out the zeros of the function. The teacher can compare each method and discuss related reasoning/thinking. More importantly, the teacher should put extra effort into engaging Latinas in solving application problems. If available, it helps to use successful solutions contributed by past Latina students to encourage the Latinas to commit to problem solving with confidence.

With Korean girls, the teacher can ask students to identify other kinds of application problems for quadratic functions involving Korean culture and life as part of the problem context and share this with the class. As the students prepare an introduction, the teacher can help with rehearsals thereby improving their language skills. For example, in order to help students relate to mathematics in real life, the teacher can challenge the girls to think about how the math skills needed to successfully solve problems 1, 2, and 3, in Fig. 1, are useful in solving the application problem. The teacher may say, "Your solution to the application problem looks great. I have an extra question for you. Can you tell me how the answers to question 1, 2, and 3 help you solve the last problem?"

Strategy 3: Reach Out and Increase Communication with Families of ELLs

With Latina ELLs, teaching mathematics with a practice connected to their lives can help them see the utility and importance of mathematics. For example, the teacher may engage students in mathematics through the analysis and crafting of possible solutions to societal problems that students and their families are facing inside or outside the classroom, which is an effective strategy to engage Latinas in changing their perception of mathematics. Instead of the application problem in the scenario involving a student artist, for example, the teacher can use a different context in which the demand function and price in the quadratic equation is for a pharmaceutical company's revenue and highlight the use of mathematics through socioeconomic issues.

In addition, the teacher can encourage Latina students to develop teaching strategies for using number sense to factor a quadratic equation by stating, "I know a lot of you are tutoring your siblings every day. I have an interesting number sense

problem drawing from the first question. Think about various ways to figure it out, share out, and use it for helping your siblings tonight." For example, students need to find two integers +5 and −8, whose product is −40 and the sum is −3 as part of composing two factors consisting of a number and a variable.

Since Korean parents tend to focus a great deal on their children's academic performance, they may appreciate when a teacher uses assessment data to identify strengths and weaknesses to guide students toward improvement. However, some parents may take an assessment outcome too seriously or see it as representing the whole learning process. With Korean girls, teachers should explain to parents about the value of classroom participation, which helps describe how their daughters are performing in summative assessments as well as how they are developing social and emotional skills in the classroom community. When a Korean girl does poorly on the exam, it is important to reflect on formative assessment data and make an effort to draw a *qualitative* picture of the student's learning. In that sense, it is important to keep a note of student contributions in the class and share this data with parents. This active communication with parents will play a significant role in helping Korean girls to shape an appropriate learner identity in the participatory classroom community.

Strategy 4: Create a Multilingual Climate in the Classroom and Tap into Various and Alternative Mediums of Communication

For both Latina ELLs and Korean girls, the essence of a multilingual climate in the classroom is to utilize various languages including gesture and drawings to facilitate a productive discussion. While the acquisition of mathematical vocabulary is important, the greater emphasis should be on developing mathematical ideas and keeping the discourse going. For example, when a student is confused about the math phrase "concave up or down", the teacher should recognize the students using their arms to indicate the shape and continue developing mathematical ideas, rather than disrupting the conversation to teach the vocabulary. Related, it helps to implement various language complexities into a mathematical task so that students can exercise mathematical thinking separately from everyday language. For example, the teacher may keep a high language complexity for the application word problem in Fig. 1, but reword the instructions as "Solve, explain, and prepare a talk." Similarly, the first question can be simplified as "$-x^2 + 3x + 40 = 0$; x = ? or x = ? ", and the second question can be presented as "$f(x) = -x^2 + 3x + 40$ (showing a graph with the vertex marked (?, ?)".

In addition, teachers can use revoicing in classroom discussions to help ELLs feel acknowledged and accepted and to illustrate a variety of ways to communicate meanings (O'Connor & Michaels, 1993). For example, referencing the graphs, the table, and the solution set, a student may try to explain that the zeros of a quadratic equation, the solutions to the equation, and the coordinates of the x-intercept are conceptually the same. The teacher should recognize the student's contribution and describe her idea in the teacher's words: "What Erica just told us is that the zeros of the function f(x), the two solutions to the equation $-x^2 + 3x + 40 = 0$, and the coordinates of the x-intercept (pointing to the graph) are conceptually equivalent. Can you also find −5 and +8 from the x-y table?"

5 Conclusion

It is a daunting task to consider the variety of cultures, social contexts and needs of all English learners in the classroom. It could feel frustrating, especially when cultural insight into one group of students does not apply to other groups, or even conflicts with interactions with another group of students. However, through learning about students' cultural backgrounds, embracing cultural differences, and developing sensitivities to the immigrant student struggle, U.S. teachers can expand their worldview and put things in perspective. The relationship with immigrant students is a complex and dynamic one, therefore mathematics teachers should also develop insight into students' emotional-behavioral needs. With a better understanding of the students' thinking and actions, teachers can have the rewarding experience of fostering a new mindset of learning for immigrant students in which they are active participants in the classroom community. In closing, we argue that attending to student identities, knowledge, languages, and cultures to create a safe, interactive learning environment is an integral part of the culturally competent and inclusive mindset of mathematics teachers.

Reflection Question

As closure, we offer one question for the reader's reflection:

1. How does your teaching practice draw on students' cultural and language assets and resources (other than English or the language of instruction) to communicate mathematics effectively in the classroom?

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Linguistically Responsive Teaching to Foster ELL Engagement, Reasoning, and Participation in a Mathematics Discourse Community

Mary A. Avalos and Walter G. Secada

Abstract We draw upon a co-teaching experience in a 6th grade mathematics classroom to discuss how mathematics teachers can carry out research-based suggestions to foster ELLs' engagement and participation in mathematics discussions to apprentice use of the mathematics register and ultimately, to develop content understanding. We illustrate our approach based on actual experiences to establish an environment conducive to discussions in an urban classroom, with the objective of utilizing semiotics, such as language, symbols, and visual representations during instruction as relevant mathematical meaning-making systems. An instructional focus on meaning-making can prepare ELLs for problem-solving discussions in a discourse community.

1 Introduction

The first author (Mary) co-taught a sixth grade mathematics class for approximately 3 months, implementing a "community-of-practice" (Lave & Wenger, 1991), also known as a "discourse community" (Lampert, 1990; Swales, 1990) approach to teaching mathematics. This approach paid explicit attention to the students' use of the mathematics register (disciplinary discursive practices; Halliday, 1978) and to academic language through word problems, visual or concrete representations, written explanations, and discussions of problem solving processes. The development of mathematics discourse communities has been advocated for decades since discussing mathematical solutions inducts students into using the language of the

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discipline while they learn content (Herbel-Eisenmann, Johnson, Otten, Cirillo, & Steele, 2015). Unfortunately, developing mathematics discourse communities in classrooms is not an easy task due to a lack of student participation or discourse on worthwile mathematical ideas (Silver & Smith, 1996), little instructional or administrative support for implementing this approach (Eacott, 2011), and/or pedagogical tensions that lead to disjointed discussions (Sherin, 2002). Furthermore, the prerequisite development of community among students to foster a successful culture for engaged reasoning, thinking, and learning during mathematics discussions is often overlooked.

The need for teachers to recognize the importance of language use during mathematics and to develop a classroom culture that is conducive to mathematics discussions is important for all students, but is especially pertinent for English language learners (ELLs) (Willey, Gatza, & Flessner, 2017). In the co-teaching experience described below, we learned a great deal about developing community (e.g., a respectful and caring environment) to foster mathematical literacies and prepare diverse students for mathematics discussions. In particular we explored what it looks and feels like: (a) for a teacher who wants to implement this approach; (b) for struggling students who do not see themselves as mathematically inclined; and (c) for ELLs who may (or may not) have knowledge of the content in their first language (L1) and have difficulties expressing their knowledge while acquiring and learning in a second language (L2) at school. This chapter shares our experience with fostering community to develop mathematical discourse, including making conjectures, justifying solutions, and explaining student thinking (Williams & Baxter, 1996). We show how Lucas and Villegas's (2011) linguistically responsive teacher qualities might be operationalized to effectively prepare ELLs for mathematics discussions, and we discuss dilemmas teachers may face when using a "mathematics discourse community" approach to foster a participatory environment for *all* students.

2 Approach to Teaching Mathematics to ELLs: Teaching Mathematics Within a Discourse Community

Reforms in school mathematics curriculum and teaching stress the need for problem-solving approaches to promote students' reasoning and communication skills (National Governor's Association Center for Best Practices, Council of Chief State School Officers, 2010). Horn (2007) noted that high-school mathematics teachers generally view mathematics as a stagnant discipline, with content coverage their primary goal to prepare students for higher-level math classes. Reform notions, however, present mathematics as a socially constructed discipline that changes over time (Kitcher, 1986) and as a system of important and deeply connected ideas (Boaler & Humphreys, 2005; NCTM, 1991).

Communication in mathematics classrooms needs to be taught; Rittenhouse (1998) likens mathematics talk to a new language since mathematics discourse makes use of specialized technical terms, a technical style of argument, and forms of reasoning that are unique relative to other subject areas. ELLs need to engage in mathematics discourse beyond vocabulary at the word level, not only to communicate their knowledge, but also to build, understand, and retain their mathematical content knowledge (Moschkovich, 2010, 2012).

2.1 Teacher's Role in Fostering a Mathematics Discourse Community

Teachers play a key role in fostering participation in discourse-oriented classrooms (Kuhn & Zillmer, 2015). For example, during discussions they must be aware of when to "step in" by guiding students' knowledge production versus when to "step out" (Rittenhouse, 1998, p. 173) to supply information that students need to support their thinking (Edwards & Mercer, 1987). Teachers' verbal and non-verbal cues can provide hints as to the expected answer ("stepping in"); yet if the teacher does not intentionally scaffold towards student independence (i.e., "stepping out), the shift of responsibility-for-learning from teacher to student may never occur. As a result, students' mathematical understandings may not develop as expected (Edwards & Mercer, 1987). For example, it may be expedient and save time for teachers to provide hints or the "answer" to a struggling student while discussing solutions for problem-solving, but the consequences of doing so may not lead to developing the student's reasoning and understanding. Alternatively, the student may need support in order to solve the problem. Such decisions may be difficult for teachers "in the moment" of problem-solving discussions. Finally, teachers need to extend discussed strategies and concepts beyond the solving of a particular problem to wider, more authentic contexts. For example, students might physically measure areas and perimeters of the same space(s) as a real life application of learning the difference between the two constructs.

Teachers should be conscious of how mathematics discussions may position students to further establish their academic identities (van Langenhove & Harré, 1994). During conversations, social forces work to position speakers and listeners based on acts of speaking and the relationships between the speakers. While the positioning of students by teachers is generally not intentional, roles related to power (i.e. teacher as authority), competence or knowledge (high vs. low mathematics proficiency), and trust (van Langenhove & Harré, 1994) are assigned during teacher-student and student-student interactions. A student's identity—both academic and/or mathematical—is often based, at least in part, on how he/she is (or isn't) positioned in class as a "do-er" of mathematics. These dilemmas are important for teachers to consider when facilitating discussions. In the next section we describe Lucas and Villegas' (2011) framework and suggest how teachers can facilitate ELL participation in mathematics discussions.

3 Theoretical Foundations of the Approach

Lucas and Villegas (2011) describe qualities needed to teach ELLs in linguistically responsive ways. They organize this teaching framework into two main categories, as briefly summarized below: Orientations, and knowledge and skills of linguistically responsive teachers (for more details, see Lucas & Villegas, 2011).

3.1 Orientations of Linguistically Responsive Teachers

Sociolinguistic consciousness (SC) entails an understanding that language, culture, and identity are deeply intertwined, as well as an awareness of the sociopolitical dimension of language use and language education. Language and language use vary according to the context and speaker's purpose for communicating; there is no inherently "better" language when comparing languages as they all provide meaning and identity to the speakers who use them. Generally, the language of power maintains a dominant presence in schools via language policy (de Jong, 2013); teachers with SC value all linguistic backgrounds and are sensitive to the fact that ELLs often come to school speaking non-dominant languages. Such teachers will recognize that ELLs should be able to draw on their full linguistic repertories to translanguage[1] (García, 2009); this helps to dismantle some structural inequalities that often silence and alienate ELLs in schools.

Teachers who **value linguistic diversity** show respect for ELLs and create an inclusive classroom environment that welcomes their participation. This respect conveys a message of high expectations not only with L2 and academic development, but also with continued L1 development. Parents of ELLs are encouraged to speak, read, and write in the L1 to foster bilingualism and positive identities related to students' backgrounds. Teachers who do not speak the L1(s) of their students could learn basic greetings and phrases to demonstrate that language is valued and to communicate with students and families.

Linguistically responsive teachers **continuously advocate for improving the education of ELLs**. Equity is at the heart of advocacy efforts since most ELLs have cultural and/or linguistic backgrounds that typically do not result in a strong voice for/against decisions that affect them. Teachers can advocate for ELLs by voicing concerns or issues related to some combination of curricular, instructional, and/or assessment policies and practices at the state, district, and/or school levels. Encouraging and empowering ELL parents and other community advocates' involvement is another way teachers can advocate for ELLs.

[1] Translanguaging has been defined as bilingual discursive practices that make use of a person's full linguistic repertoire to create meaning; translanguaging practices go beyond (but also include) code switching to facilitate communication and sense-making of bilingual worlds (García, 2009).

3.2 Knowledge and Skills of Linguistically Responsive Teachers

It is necessary to **know about students' lives outside of school** in order to engage and effectively teach them (Lucas, 2011). Even though ELLs may receive support at school and be designated as English speakers of other languages (ESOL), they form heterogeneous groups. Regional differences can create diversity among students who share the same language background. Spanish-speakers, for example, use different vocabulary, phrases, and accents in Spain, the Caribbean, Mexico, North, Central, and South America; hence Spanish-speakers are extremely diverse. Teachers can interact with students in and outside of class, communicate with parents, and show interest in students' well-being and life outside of school.

By **anticipating and identifying the language demands of classroom instruction and assignments**, teachers can scaffold ELLs' content and language learning. The academic English needed to be successful in school goes beyond word-level vocabulary and includes specific grammar features at the sentence, paragraph, and text levels (Schleppegrell, 2004). A detailed analysis of curricula enables proactive planning and instruction that will better meet ELLs' language and content-learning needs (Lucas, 2011).

There are four types of scaffolds that assist ELLs with content learning: (1) using extra-linguistic supports such as visuals, graphic organizers, hands-on activities, and/or alternate assignments that allow for drawing and use of pictures to present knowledge; (2) using supplemented/modified written text to include study guides, adapted or highlighted texts, notes, and/or summaries; (3) using supplemented/modified oral language to minimize idiomatic expressions, using the L1 to relay key concepts, taking time to explain key words and concepts, provide outlines, give examples, pausing more often, and repeating key concepts; and (4) providing clear and explicit instructions by listing steps for students to see on a board, asking students to repeat what they need to do in their own words, and including details in the instructions. For specific examples of how these principles can be applied to planning and teaching mathematics to ELLs, see Avalos, Medina, and Secada (2015).

By **applying five key principles of L2 learning**, teachers demonstrate they understand L2 acquisition processes and integrate those processes within instruction.

Principle 1: Conversational language proficiency is fundamentally different from academic language proficiency. Though conversational language proficiency is important for every day interactions, both types of language proficiency are needed for school success (Lee, Quinn, & Valdés, 2013). Academic language proficiency generally takes longer for ELLs to develop; however, with L1 grade-level literacy proficiency, students will develop L2 academic language more quickly (Thomas & Collier, 2002).

Principle 2: ELLs need comprehensible input just beyond their current level of competence. When planning instruction, the quality and nature of the L2 is more important than the amount of exposure to the L2. To effectively follow this principle, teachers must know their ELLs' language and content learning needs.

Principle 3: Social interaction for authentic communicative purposes fosters ELL learning. ELLs should have meaningful L2 input during class in spaces that motivate them to take risks and to learn from interactions with others. Flexible grouping, tasks that reflect real-world problems and that maximize student-to-student and teacher-to-student interaction, and teachers' use of questions facilitate comprehensible input and language output.

Principle 4: Skills and concepts learned in the first language transfer to the second language. Students who have domain knowledge in their L1 can transfer that knowledge to the L2 (Thomas & Collier, 2002). Thus, it is important to have a good understanding of what ELLs know in their L1, and to encourage families of ELLs to continue interacting in their L1 to build important skills and concepts.

Principle 5: Anxiety about performing in a second language can interfere with learning. ELLs face many unknowns when entering a different culture, way of life, and school; learning environments create even more stress for ELLs when they feel inferior or unwelcome. These feelings can interfere with learning and inhibit motivation for learning. Teachers are key to creating safe and welcoming classroom environments that promote ELL participation and contributions to classroom learning.

The orientations for the Lucas and Villegas (2011) framework are important to promote linguistically responsive teaching practices for ELLs. We now describe how these orientations played out in a sixth grade "intensive" mathematics class as a mathematics community discourse approach was implemented.

4 Implementation of the Approach: Teaching Mathematics Within a Discourse Community

Mary's co-teaching took place in an urban Southeastern school during a 90-min math class for twenty-six 6th graders who scored "below proficient" on the state's mathematics assessment the previous year. About one fourth of the students were ELLs at the pre-emergent or intermediate proficient stages of English acquisition (Spanish and Haitian-Creole speakers); these students received ESOL services from a paraprofessional who came to the class once a week to work with ELLs on tasks provided by the teacher. About one third of the students were identified for special education services; in addition to another period in which they received instruction pertaining to their individual education plans, a resource specialist came to the class every other week to work with these students. The remaining students were considered English proficient; either they were monolingual, or they had already met the

state's English proficiency criteria and were exited from ESOL services. Some students had recently arrived to the U.S. while others had lived in the school's neighborhood since birth.

We discuss the use of a mathematics discourse community approach below within three broad categories—establishing norms for classroom participation, students' self-concepts and perceptions of mathematics teaching and learning, and providing equal access to and opportunities to learn. Practices that operationalized the Lucas and Villegas (2011) framework are summarized.

4.1 Establishing Norms for Classroom Participation

Mary met her students and began to establish a student-centered, discourse-oriented classroom environment on the first day of school. The students generated classroom rules that would allow everyone to learn (e.g., "Be respectful," "Do your work"). Students were pressed for examples and non-examples for each rule, and a final set of rules was documented on chart paper so that students could refer to them with clear expectations.

Building Rapport The rest of the first day and the second were spent talking about life outside of school. These discussions allowed for important foundations: a mutual rapport was established that would not have been possible without these conversations, the students were being apprenticed to use social skills needed for productive discussions without the stress of being "right" about mathematics content, and interests were highlighted and shared. This informed how tasks could be modified and used in class to align with what was important to the students. Something else that facilitated rapport was consistent communication with parents. Mary phoned a few parents each week to compliment their child, relay academic progress, and discuss ways parents could support learning mathematics. These calls were always appreciated and they served to strengthen Mary's relationships with the students.

Tools to Apprentice Discourse As a bilingual teacher (Spanish/English), Mary utilized Spanish to assist those who needed the L1 support with the content; bilingual Creole/English students and a paraprofessional assisted ELLs needing support in Creole. The use of L1 (by teacher, aide, or peers) was encouraged in order to promote comprehension and participation. Soon after the first day of class, Accountable Talk® (Michaels, O'Connor, Hall, with Resnick, 2010) moves were introduced to scaffold students' responses during discussions. Accountable Talk® (AT) moves provide teachers with alternatives to evaluating student responses according to different purposes for classroom talk. For example, Mary used AT moves that press for reasoning or clarification, such as "Can you say more about that?" in order to "step in" or "step out" of the discussion (Rittenhouse, 1998, p. 173). Additionally, AT moves apprenticed students to respectfully disagree, agree,

or ask questions. Two or three new AT moves were introduced every 2 weeks. At first, discussions were stilted; yet once AT moves became part of the students' linguistic repertoires, students used them quite naturally as part of discussions.

Creating a Safe Space for Discussions Mathematics discussions were supported by visual representations, projected solutions, gestures, and the L1. Translanguaging (García, 2009) allowed students to make full use of their linguistic repertoires, and ELLs were encouraged to speak in their L1; however, establishing an environment conducive to productive math discussions takes time and effort on the part of the teacher and the students. While the extra steps taken during the first few days were helpful in establishing a positive rapport and an environment to begin mathematical discussions, there were difficulties, especially in the first weeks. The students knew they were in the "double dose" math class because they had not scored well on the state test the previous year; their identities as low-achieving mathematics students had been established. Most of them had been tracked into remedial classes for the entire day resulting in personality conflicts among students, many of whom also had challenges executing desired school-based social skills. The remediation-oriented environment in which the students were placed did not support (and sometimes, actively undermined) the discourse community efforts taking place in their mathematics classroom. Despite having taken part in creating ground rules and norms on the first day of class, many students bickered among themselves, picked on each other, and brought up issues from their other classes.

A couple weeks after school began, Mary asked the students if they knew about the "golden rule" and most students claimed they had never heard, "Treat others as you want to be treated." After a lengthy explanation and examples/non-examples of what the clause means, the golden rule became the classroom's new motto. The students seemed to relate to this much better than the norms that they initially articulated and defined. Any snicker or bit of sarcasm uttered in response to another student's participation was squelched when students were asked, "Is that how you would want to be treated?" Eventually, within a few weeks of consistently applying the "golden rule," the atmosphere truly became conducive to productive conversations and discussions; ELLs and other students who had been inhibited participated without fear of being ridiculed.

In order for students to learn using a discourse-based approach, they must be able to positively relate to each other. According to Wegerif (2006), the main mechanism for learning is taking the perspective of someone else and using dialogue to realize and understand different perspectives. Moreover, Kazak, Wegerif, and Fujita (2014) state that using a "dialogic" approach to teaching puts the quality of relationships over explicit verbal reasoning as a primary focus for teaching and learning. The "golden rule" went beyond the rhetoric of classroom rules in helping all students overcome initial differences and understand how to treat and show respect to each other; in turn, this newfound mutual respect enabled students to create academically productive relationships.

4.2 Students' Self-Concepts and Perceptions of Mathematics

Give Them Something to Talk About Mary started teaching where, according to a diagnostic assessment, most of these sixth graders were mathematically—adding and subtracting with regrouping. She used lessons with place-value mats, beans, cups, and other manipulatives to teach the base-ten number system. Although the ELLs in the class seemed to know regrouping procedures, they lacked conceptual understanding of regrouping and their number sense was weak; hence, they benefited from using manipulatives while using the mathematics register in the L2. Discussions focused on explaining why, when, and how to regroup with the base-ten number system. Even though all of the students had opportunities to discuss their solutions in small group settings prior to whole class discussions, initially their replies to Mary's questions and AT moves were monosyllabic answers. At first, Mary thought that their limited participation was due to focusing on the answers to problems rather than solutions. After a week of lessons on regrouping, however, there was more participation. Each time a new construct or concept was introduced, participation waned; however with more experiences and exposure to the concept, students seemed to become more confident and to participate more fully during discussions. Hence, while the novelty of mathematical discussions probably did play a part in the students' limited participation, mathematical understanding also appeared to limit their participation. Students needed multiple experiences with the content before participating at an expected level.

Teach Deeply As different concepts were introduced, conceptually-oriented lessons using manipulatives and other concrete representations were taught to help students understand the "why" behind the procedures. Near the end of the second month of using this approach, students' surface-level focus on procedures gave way to talk that was more ritualistic (Williams & Baxter, 1996). Justification of thinking and reasoning behind solutions slowly emerged without prompting as students were inducted to the expectation of providing justification during discussions. Instruction that first focused on developing concrete understandings of the concept created a scaffold that supported abstract understandings, and mathematical discussions became richer and more varied than when conceptually-oriented lessons were skipped to provide an algorithm. By focusing their attention on the "why" behind the "how" in mathematics, the majority of the students—including ELLs—began to understand that mathematics was about sense-making and reasoning. Finally, after about 6 weeks into the school year, most were on their way to being "do-ers" of mathematics.

4.3 Equal Access to Mathematics

Planning and Setting Up Math Tasks To plan for the task set-up and mathematics discussion, we adapted Smith and Stein's (2011) planning template to identify contextual, language, and domain knowledge (see Avalos, Medina, & Secada, 2015).

This planning tool helped Mary to anticipate (a) possible solution paths students might use in solving a problem so that she could orchestrate discussions, and (b) the components of the task that may need scaffolding for students to gain access to and solve the problem. Knowing ELLs' content knowledge in their L1 and their L2 language-proficiency and content-learning needs enabled Mary to make effective use of the tool.

During the task set-up, discussing the context of the task helped the class create shared meaning of the situation for the math problem (Jackson, Garrison, Wilson, Gibbons, & Shahan, 2013). This began by asking students what they knew about the context. Mary also called attention to language features found in mathematics problems that are known to be problematic for comprehension such as vague referring words, technical vocabulary, and multiple-meaning words (Schleppegrell, 2007). Discussing context and deconstructing the problem's language facilitated access to problem solving and thus greater opportunities to understand the mathematics content.

Student Resistance and (Dis)Engagement At the beginning of the school year, many English-proficient students lost interest in what the class was doing because most of them felt the open-ended mathematics tasks and discussions were too challenging for them. To help students build stamina for problem solving and reasoning, we found that guided lessons were more effective when introducing new concepts; as a result, conceptual lessons using manipulatives were used to scaffold specific learning outcomes (Edwards & Mercer, 1987). After the guided lessons, the class solved and discussed open-ended tasks that built on conceptual understandings. The more the students understood about mathematics concepts and procedures, the more they were able to justify and defend their solutions during mathematics discussions.

Keep Calm and Press On Initially many English-proficient students in the class resisted a discourse-based approach; consequently, they did not work well in groups. Many students wanted Mary to "just teach" and often did not want or know how to scaffold the information to their small group peers. This contributed to disengagement for students who did not need as much time, and for those who felt they could not solve the tasks without support. Mary set a timer and called on random group members to explain their solutions; everyone became accountable for their group's solution. Group points were awarded when groups worked well and all members could explain how they solved the problem. The small groups with the most points every other week earned a pizza lunch with Mary, leading to more conversations about family and after-school life. Eventually the need to award points for all group members to do their work diminished; but when first beginning to implement this approach, Mary found that some students needed incentives to be accountable for themselves and to find ways to collaborate with or help their group members. Overall, the mixture of English-proficient and ELL students in groups had a positive impact on classroom culture and learning.

(In)Consistency Matters As a co-teacher, Mary taught about 4 days/week at the beginning of the school year and, through her consistent teaching, she was able to establish the classroom norms and mathematical practices needed to support mathematics discourse. However by the third month, she could teach just 2 or 3 days/week. Upon her return to the classroom each week, it took up-to a couple days to get the class back to where they had been vis-à-vis norms and productive group work before she left. Her co-teacher was under immense pressure to cover content for the state test and approached math instruction more traditionally. The inconsistency between the two instructional approaches sent implicit conflicting messages concerning how students were positioned as learners. It is important to be aware of the messages sent to students if there is a flip/flop between a discourse-based approach and one that emphasizes a "pedagogy of telling" (Sizer, 1984, p. 109). In essence, Mary was positioning the students to be "do-ers" of math and the co-teacher was positioning them to be "receivers" of knowledge. Although difficult, and despite the mixed messages, Mary's field notes, audio-recorded mathematics discussions, and informal student feedback showed marked improvement in classroom mathematics discussions when students were prepared and apprenticed to go from peripheral to more full participation, demonstrating a deeper understanding of the mathematics register and content.

As seen in Table 1, successfully implementing a discourse community in which all students participate requires more than asking students to discuss their solution strategies. Important foundations must be attended to from the first day of class and consistently followed-up throughout the school year. Relationships with/among students and their families are key to establishing rapport and an appropriate discourse environment. If working with students who self-identify as "not good at mathematics," time for instruction that first uncovers the conceptual understanding behind the procedure appears to be necessary for rich discussions and development of reasoning. Promoting translanguaging is important for building on ELLs' full linguistic and mathematical repertoires while also establishing an inclusive culture and fostering identities as "do-ers" of mathematics.

5 Conclusion

By implementing a mathematics discourse community approach with a diverse group of learners, we illustrate how Lucas and Villegas' (2011) framework provides a helpful way of understanding the teaching practices that prepare ELLs to participate during math class. Using this approach, ELLs were seen and treated as individuals coming to school with strengths, knowledge, and a life outside of school. Building rapport with students may have taken time away from math instruction, but the return on this time-investment was evident during subsequent instruction. Discussing the golden rule and consistently expecting all students to abide by it was challenging, but necessary; teachers and peers earned respect by treating everyone

Table 1 Summary of Lucas and Villegas' (2011) framework as applied while implementing a mathematics discourse community

Orientation (Abbreviation)	Applying the orientations
Sociolinguistic consciousness	Using classroom norms diligently and consistently to promote the full participation of all students
	Building on ELLs' knowledge and understanding of language during discussions
Valuing linguistic diversity	Communicating regularly with parents and suggesting ways they can support content learning
	Promoting the use of L1 and translanguaging during mathematics instruction and discussions
Inclination to advocate for ELLs	Encouraging parents to support their child's content learning at home
	Re-visiting ground rules to implement "the golden rule" with a focus on relationships
	Using table points to incentivize students to collaborate and work together in small groups
Learning about ELLs' backgrounds	Talking about home/after school life the first 2 days of school and during earned pizza lunches
	Communicating with parents enabled/led to discussions about students' home/school life
	Using Accountable Talk Moves® for formative assessment and scaffolding of domain knowledge/language use during discussions
	Encouraging the use of translanguaging for accurate understanding of ELLs' content knowledge to inform future planning and instruction
Applying key principles of L2	Allocating sufficient time to clearly explain and provide examples/non-examples of ground rules
	Focusing on relationships to promote authentic, social interaction during mathematics group work and discussions
	Taking time to teach for deeper knowledge of content (conceptually and procedurally) and language
	Analyzing tasks to anticipate language and content demands
	Taking time to discuss and create shared meaning of the problem's context and deconstructing the problem's language

as they wished to be treated. This was difficult work and many days it seemed that it would have been much easier to return to traditional ways of teaching mathematics; however, as became evident when Mary cut back on her co-teaching, such a return to traditional methods of teaching did more harm than good because students received conflicting messages about their abilities vis-à-vis how they were positioned to learn. Also, the more the behaviors conducive to discussions were expected, the more students understood what that looked and felt like, and the more they participated. Teachers need to give students the necessary tools to participate, such as AT moves, the removal of contextual and language barriers to access, and opportunities for problem-solving. When facilitating math discussions, teachers need to attend to student thinking so as to move beyond discussions that center on procedures. We also need to encourage students when they have difficulties and celebrate

their accomplishments. Finally, teachers would benefit from networking with others who are implementing a discourse-based approach—the support will help to refocus and further the vision for teaching all students to equitably participate in developing deep mathematical understanding and participation during class discussions.

Reflection Questions

- How could you apply the Lucas and Villegas (2011) orientations to prepare ELLs for full participation in your classroom instruction and discussions?
- What available resources could assist you to apply more of the orientations at your school (or district)? Which needed resources could you advocate for with school or district leadership in order to enhance ELLs' equitable access to teaching and learning?
- If you developed a plan of action to implement or include more orientations from the framework for ELLs' instruction, which could you begin with right away and which could you work on over time?

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Part III
Science

Activating Bilingual English Language Learners' Strengths in Science: The Pedagogy of Argument Driven Inquiry (ADI)

Rebecca M. Callahan, Victor Sampson, and Stephanie Rivale

Abstract Bilingual English Language Learner (ELL) students need more opportunities to learn how to read, write, and discuss science as they learn to use the core ideas, crosscutting concepts, and practices of science to develop explanations for natural phenomena or to solve problems. This chapter describes how teachers can use the Argument Driven Inquiry (ADI) instructional approach to provide bilingual ELL students with opportunities to participate in the practices of science while strengthening both their English and scientific literacy skills. This type of language-intensive instructional approach can also help bilingual ELL students develop and maintain science identities.

1 Introduction

The bilingual student population, including both former and current English language learners (ELLs), comprises 22% of school-age youth (Ryan, 2013), and is growing at a much higher rate than native English speakers (Batalova & McHugh, 2010). Bilingual ELL students are often underrepresented in science courses, with just over one-third of these students completing two of the three high school sciences courses that are required for 4-year college admission (Callahan & Shifrer, 2012). As many US educators struggle to teach language *and* academic content

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simultaneously, it is often difficult to address the unique needs and perspectives of bilingual ELL students during classroom instruction (Calderón, Slavin, & Sánchez, 2011). Instead, instruction for bilingual ELL students in science classrooms tends to focus either on the basics, or on the development of academic language separate from the content. Bilingual ELL students, as a result, often do not experience the same rich learning experiences in science (i.e., designing and carrying out investigations, participating in engineering design tasks, working on extended and meaningful projects) as native English speakers (Durán, 2008; Fry, 2007, 2008).

These persistent inequities in science classrooms prevent bilingual ELL students from reaching the same levels of achievement as their native English-speaking peers (Durán, 2008; Fry, 2007, 2008). This trend, when coupled with the rapid growth of the bilingual ELL student population, has major consequences not only for individual students, but also for the increasingly STEM-focused US labor market. One of the most pressing challenges facing science teachers working with bilingual ELL students today is to ensure that they have an equitable opportunity to learn. Language-intensive instructional approaches that allow students to use the core ideas, crosscutting concepts, and the practices of science to explain natural phenomena or to solve problems can provide bilingual ELL students with an equitable opportunity to learn. This type of instructional approach gives bilingual ELL students an opportunity to learn how to speak, read, and write in English as they learn the content and practices of science. Language-intensive instructional approaches can also help them develop and maintain science identities through opportunities to engage in the same kinds of intellectual work that scientists engage in as they attempt to develop new knowledge inside the classroom (Crandall, Jaramillo, Olsen, & Peyton, 2002; Lee & Buxton, 2013). In this chapter, we describe one such instructional approach, *Argument Driven Inquiry* (ADI), that teachers can use in grade 3–12 science classrooms to promote and support simultaneous academic and linguistic development for bilingual ELL students.

2 Approach to Teaching Science to ELLs: Argument Driven Inquiry

The ADI instructional model, as noted earlier, is a linguistically rich approach to laboratory instruction. It is designed to give all students an opportunity to participate in the practices of science, including asking questions; planning and carrying out investigations; analyzing and interpreting data; constructing explanations; engaging in argument from evidence; and obtaining, evaluating and communicating information (National Research Council (NRC), 2012). The ADI approach encourages students to use these practices along with the core ideas and crosscutting concepts of science to *figure things out* rather than requiring them to simply *learn about* different concepts or scientific terms. ADI is based on the premise that learning

about the natural world requires people to propose, support, challenge, and revise ideas over time.

ADI provides teachers with a way to focus on what we know, how we know, and how to communicate with others in science at the same time. Teachers act as mentors during ADI, guiding bilingual ELL students as they learn how to participate in scientific practices and the discourse of science, interacting with ideas, materials, and other students. Framing science and classroom instruction in this manner helps challenge the common notion that science is something done only by white males (Riegle-Crumb & King, 2010). ADI incorporates scaffolds to support bilingual ELL students as they learn to participate in these scientific practices. Teachers can therefore use ADI to provide the opportunities, practice, and feedback that bilingual ELL students need to learn how and when to use academic forms of language in the context of science without forcing them to abandon their own language or ways of knowing.

ADI consists of eight instructional stages which include: (1) Task identification and guiding question, (2) Method design and data collection, (3) Data analysis and initial argument development, (4) Argumentation, (5) Explicit and reflective discussion, (6) Investigative report writing, (7) Double-blind peer review, and (8) Report revision and submission (see Fig. 1). In all eight stages, students produce spoken and written accounts of their experiences, engage in the editing process, provide feedback to others, and otherwise actively engage with oral and written language. While the boundaries of ADI's stages are defined by scope and purpose, the eight interrelated stages are consistent across laboratory experiences, and each one is designed to build off of the last. As a result, bilingual and English-only students alike quickly learn what is expected of them during each stage, freeing teachers to focus on students' ideas and how to best support them as they work to figure out the world.

Stage 1 of an ADI lab activity begins with introduction of a phenomenon to investigate (***task identification***) and a ***guiding question*** for the students to answer. This stage is designed to give students an opportunity to participate in the practices of (a) asking questions and (b) obtaining, evaluating and communicating information. Here, the teacher's goal is to capture the students' interest and provide them with a reason to complete the investigation. To support this goal, teachers can provide each student with a handout that provides a context for the investigation. This handout, at a minimum, should describe (a) a puzzling phenomenon or problem to solve, (b) include an overview of the core ideas and crosscutting concepts that students can use during the investigation to "figure things out", and (c) the task students will need to complete. The handout can be written in English or a student's home language.

In ***Stage 2***, ***method design and data collection,*** small groups of students develop a method to gather the data necessary to answer the guiding question and carry out the investigation. Designed to give students an opportunity to participate in the practices of asking questions and planning and carrying out an investigation, completion of this stage depends on the nature of the investigation. Some investigations call for groups to answer the guiding question by analyzing an existing data set, whereas

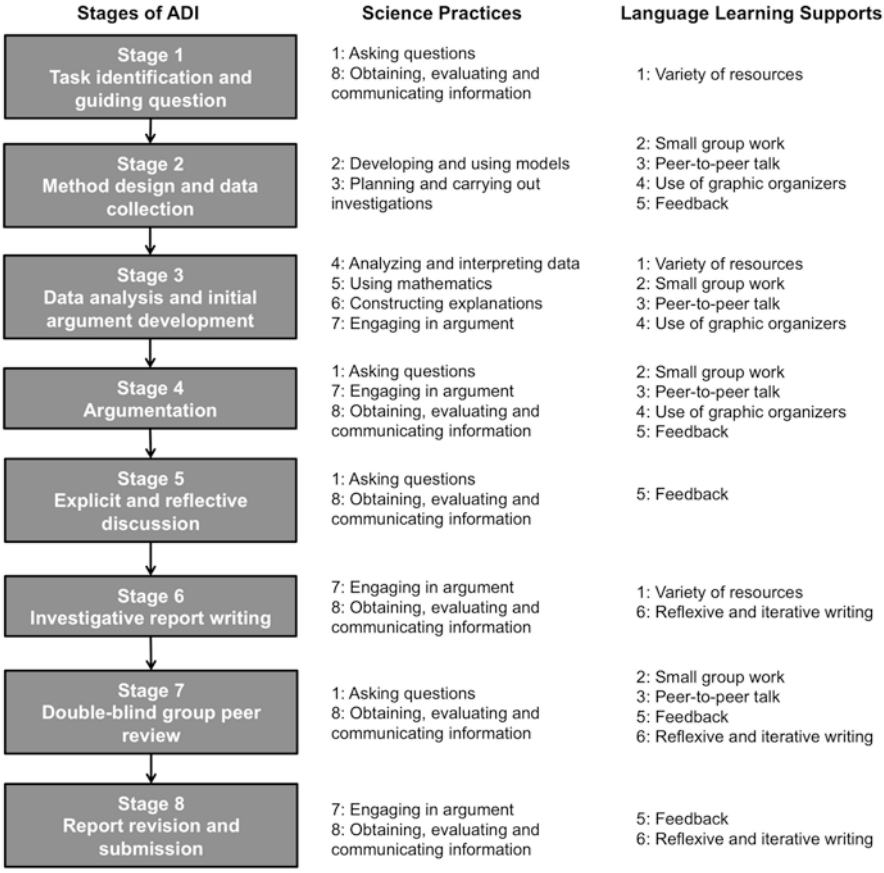

Fig. 1 Stages of the argument-driven inquiry (ADI) instructional model

others require students to design a controlled experiment. If students require assistance in method design, teachers can prompt them to complete an investigation proposal, a graphic organizer designed to guide students through the method development process (see Fig. 2 for an example of an investigation proposal). The investigation proposal prompts students to consider: what type of data they will need and how they will collect and analyze it. Here, the goal is to provide students with an opportunity to interact directly with the natural world, to learn to use new data collection tools and techniques, and to begin to address the ambiguities of empirical work.

Data analysis and argumentation comprise the next two stages, designed to help students develop and articulate sound scientific arguments. In ***Stage 3,*** students develop an initial argument in response to the guiding question. First, each group is encouraged to analyze the data collected during Stage 2. Following data analysis and interpretation of results, groups are ready to create an initial argument. Students'

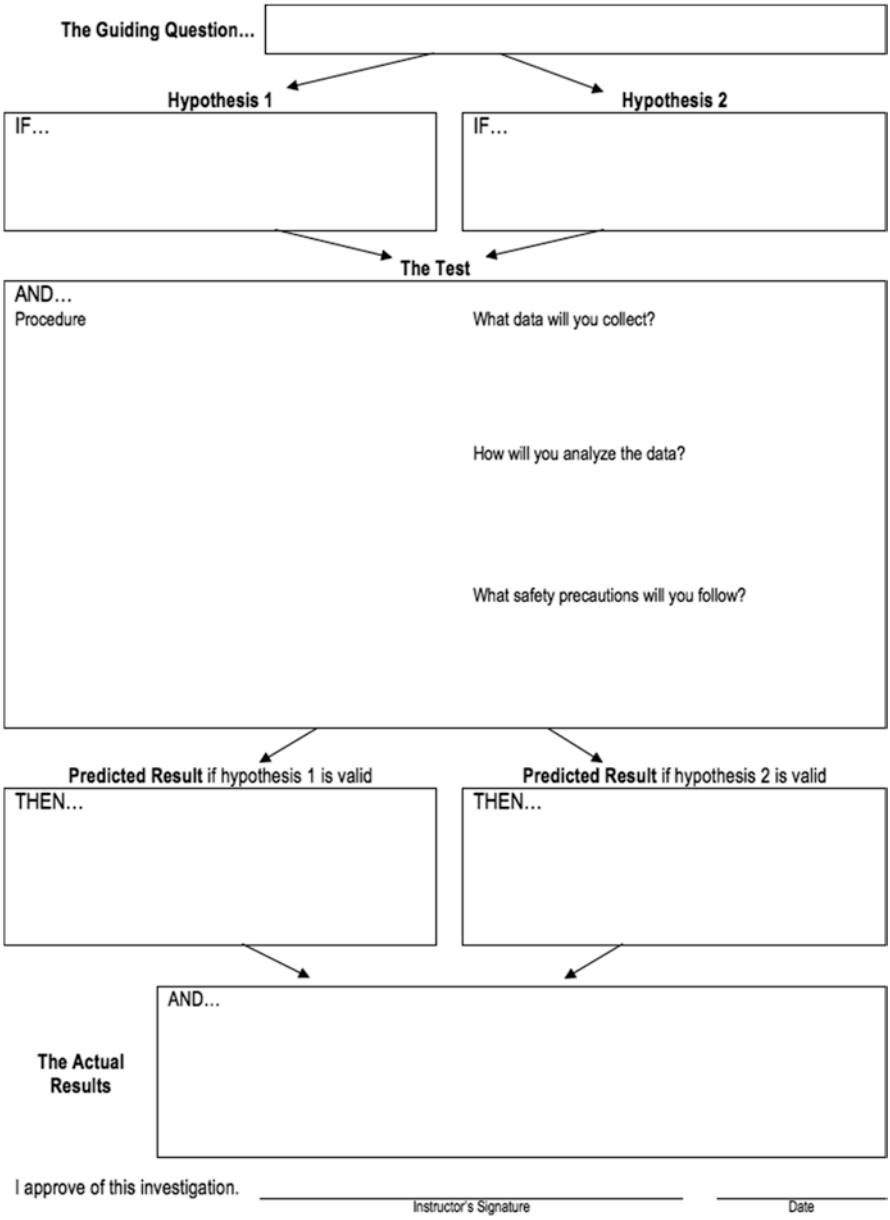

Fig. 2 Investigation proposal

arguments consist of three components: a claim, evidence used to support that claim, and a justification of the evidence. In addition, students learn how to determine if available evidence is valid, relevant, sufficient, and convincing enough to support their claim. Specifically, ADI gives students an opportunity to participate in

the practices of (a) analyzing and interpreting data, (b) using mathematics and computational thinking, (c) constructing explanations, and (d) engaging in argument from evidence. The ability to analyze data and argue from evidence are two key scientific practices outlined in the *New Framework for K-12 Science Education* (NRC, 2012).

The argumentation session in ***Stage 4*** is designed to help students learn how to use criteria valued in science (i.e., fit with evidence, consistency with scientific theories or laws) to distinguish between alternative ideas. To ensure that more students participate during the argumentation session, teachers can use a modified "gallery walk", where one or two members of each group stay at their workstation to share their group's ideas while the other members rotate individually to listen to and critique the arguments developed by their classmates. This format ensures that all ideas are heard and more students are actively involved in the process. This stage of ADI is designed to give students an opportunity to participate in the practices of (a) asking questions, (b) analyzing and interpreting data, (c) engaging in argument from evidence, and (d) obtaining, evaluating, and communicating information. Again, the ability to communicate and evaluate information is a key scientific practice (NRC, 2012).

In ***Stage 5,*** explicit and reflective whole group discussion provides a venue for students to talk about and reflect on what they have learned during the investigation. Whereas Stage 4 affords the opportunity for peer-to-peer interaction and feedback, the classroom teacher leads this discussion. The classroom teacher uses this whole group discussion to give all students an opportunity to reflect on their individual understanding of the core ideas used during the investigation and how core ideas can be used to help develop explanations or models. It also encourages students to think about how to improve their participation in other scientific practices such as planning and implementing investigations, analyzing and interpreting data, and arguing from evidence. Importantly, however, this explicit and reflective discussion is not a lecture, but rather an opportunity for students to share what they know or do not understand, and to develop shared norms for how they will, as a community, participate in the practices of science in later investigations. The greater the student discussion, the more meaningful the experience and the more the teacher can learn about student thinking.

The next three stages focus on producing, crafting, sharing, critiquing, and revising texts specific to the genre of scientific writing (de Oliveira & Lan, 2014). In ***Stage 6,*** students write investigative reports individually, mirroring scientists' responsibility to share the results of their own research through writing (Saul, 2004) in a manner that reflects the standards and norms of the scientific community (Shanahan, 2004). In this stage, each student must negotiate meaning as he or she writes, which in turn, helps refine and/or enhance the understanding of the material (Hand, Norton-Meier, Staker, & Bintz, 2009; Wallace, Hand, & Yang, 2005) while developing the language of science. Designed to give students an opportunity to practice (a) constructing explanations, (b) engaging in argument from evidence, and (c) obtaining, evaluating, and communicating information, this stage is critical to

guide bilingual ELL students through a realistic writing task with a scientific purpose.

Stage 7 is a double-blind peer-review of student reports. The teacher collects the reports written by each student and then randomly distributes them to the lab groups, along with peer review and teacher score sheets. The peer review and teacher score sheet includes specific criteria to be used to evaluate the quality of an investigative report with space to provide author feedback. The intent of this stage is to help students improve their science writing ability by providing explicit criteria for what counts as quality in science context, detailed feedback for improvement, and perhaps most importantly, an opportunity to read, discuss, and critique the writing of others. Here, peers' writing provides both strong and weak scientific writing examples written for the same purpose but by different authors. Here, ADI is designed to give students an opportunity to participate in the practice of obtaining, evaluating, and communicating information. In particular, bilingual ELL students have the potential to benefit greatly by not only receiving, but also learning to provide peer feedback while discussing criteria that are used by members of scientific community to assess quality. Rarely do students learning English receive multiple opportunities to read, discuss, and critique their peers' writing in an iterative manner, especially in science, and ADI provides ample opportunities to do so. Such opportunities help bilingual ELL students develop the knowledge and skills needed to identify the strengths and weaknesses of others' written arguments.

In ***Stage 8***, students have the opportunity to revise their reports based on the feedback they received and what they learned by reading and reviewing their peers' written reports. This process requires that students explain how they addressed reviewers' concerns, providing a mechanism that can improve bilingual ELL students' writing, reasoning, and understanding of science content through an iterative refinement process. Here, bilingual ELL students also experience the entire writing process (i.e., construction, evaluation, revision, and eventual submission) in a manner consistent with the norms and epistemological commitments of the scientific community. Once the report is revised, it is submitted for teacher evaluation along with the original rough draft and the peer-review and teacher-scoring guides. The intent of this stage is to provide students an opportunity to improve their writing mechanics while developing their reasoning and understanding of the content. By supporting students in obtaining an optimal grade on their final product, this process also significantly reduces extraneous academic pressure.

3 Theoretical Foundation of the Approach

ADI is based on social constructivist theories of learning in science (see Anderson, 2007; Driver, Asoko, Leach, Scott, & Mortimer, 1994; Scott, Asoko, & Leach, 2007) and systemic functional models of language use in the classroom (see Gibbons, 2002; Halliday & Martin, 1993; Macken-Horarik, 2002; Schleppegrell, 2004). Specifically, ADI posits that science learning is both social and individual in

nature, and as such, teachers must focus on the role communication plays in the linguistic, academic, and scientific development of bilingual youth inside the classroom. The social and individual aspects of learning are important to consider in science due to its unique disciplinary discourse conventions. Science discourse conventions have evolved over time based on what scientists have found to be effective and efficient ways to communicate. Accordingly, learning a discipline-based discourse socializes the learner in how members of that discipline talk, write, and develop new ideas. Students must learn how to use the discourse of a discipline, alongside their own, to explain the natural world in a way that is consistent with "what counts as knowing" in that discipline. In addition, systemic functional models of language stress the importance of integrating language learning into the science content being studied in order to provide bilingual ELL youth with a linguistic starting point. Individuals, from this perspective, require more than technical vocabulary in order to learn the discourse of a scientific discipline; they must experience repeated opportunities to participate in the practices of that discipline.

The eight scientific practices outlined in the *Framework for K-12 Science Education* (NRC, 2012) both represent what scientists do as they attempt to understand how the world works and are a necessary part of what students must do to learn science and understand the nature of science. Individually and collectively, these practices prompt students to engage with language in meaningful ways to communicate their needs, ideas, questions, claims, reasons, and conclusions. When students participate in these practices, they must use language in order to negotiate meaning with others. A practice-oriented science classroom, then, can be a rich science-learning and language-learning environment. For this to occur, however, the teacher must first define and facilitate a culture of classroom discourse that fosters simultaneous academic and linguistic development in science. This culture should be inclusive of different views and modes of communication, encouraging students to maintain a spirit of exploration and explanation while they question others, ask for clarification, and provide arguments that support or challenge different ideas. This type of focus enables bilingual ELL students to hear many examples of the discourse that they are expected to learn. In this context, teacher knowledge about language and language learning strategies can not only improve students' overall science learning experience inside the classroom, but also make bilingual ELL students' learning experiences more equitable.

4 Implementation of the Approach

A practice-oriented science classroom can be a rich environment for students because people use language to negotiate meaning. ADI can create a meaningful science-learning and language-learning environment for bilingual ELL students, provided that teachers facilitate all students' participation in the practices of science. ADI's language-learning support strategies help ensure that learning

experiences are equitable for all, including bilingual ELL students. In this section, we describe how teachers can support bilingual ELL students inside the classroom.

From a linguistic perspective, ADI's early stages, ***identification of the task and guiding questions*** and ***method design and data collection*** *(1–2),* provide targeted opportunities for bilingual ELL students to engage with materials rich in disciplinary language and scientific discourse (August et al., 2014). These stages also position *all* students as scientists, validating learners' prior knowledge to address new problems (Meyer & Crawford, 2011). ADI handouts organize the science content for easy reference, providing bilingual ELL students with a variety of resources (Diaz-Rico, 2013). Small group work in the second stage also offers bilingual ELL students the opportunity to engage in content-based discussions with peers, collaborate to negotiate meaning, and experiment with different modes of presenting ideas, all strategies central to scientific discourse (Lee, Quinn, & Valdés, 2013). Engaging in small group discussion provides not only academic but also discipline-specific opportunities to employ scientific reasoning through the language of science to advocate for a position or method (Bunch, 2009). In addition, graphic organizers (Goldenberg, 2013) detailing investigation proposals provide bilingual ELL students textual references on which to structure their oral language production. Teachers can support bilingual ELL students during these initial stages by facilitating and monitoring the structure of classroom discussions, employing pair and small group work, and modeling the scientific inquiry process, both aloud and in writing. Observing their teachers as scientists and engaging in and modeling scientific inquiry provides bilingual ELL students with meaningful support during these initial stages.

For example, an ADI lab might begin by introducing students to a phenomenon such as the urban heat island effect. The urban heat island effect describes how inner cities and suburbs tend to be much warmer than rural areas as a result of land use and human activities. From there, students are reminded of several core ideas such as the nature of thermal energy and the different ways thermal energy can transfer into, out of, or within objects, as well as more general crosscutting concepts (i.e., cause and effect relations, stability, change in systems). These ideas and concepts are highlighted so students can use them as conceptual tools to identify the underlying cause of the urban heat island effect. Students are then asked to use these ideas and concepts to plan and carry out an investigation to determine the relationship between the materials covering an area and the rate at which the temperature of that area changes over time.

Later, students would carry out a controlled experiment and collect data to determine how quickly different types of materials heat up or cool down. They could place equal mass samples of different types of ground cover, such as dark-colored sand, light-colored sand, water, and gravel, under a heat lamp and then record how the temperature of each sample increases over time. From there, students could also turn off heat lamps and monitor how the temperature of each sample decreases over time. This stage of this lab concludes with each group of students in the class having a set of data to draw upon during the next stages.

During ADI's generative stages, ***data analysis, argumentation,*** and ***discussion,*** bilingual ELL students more fully engage in the discourse of science, not only through its academic lexicon (stage 3), but also through the processes of analyzing data, interpreting results, and synthesizing findings to create, present, and defend an argument (stage 4). These two stages combine to embody content-based language instruction in science (Lee et al., 2013). Incorporation of the scientific process into bilingual ELL students' daily experiences contributes to later identification with the discipline of science (Gonsalves, 2014; Varelas, Martin, & Kane, 2012). More than a means to memorize scientific terminology, these experiences apprentice bilingual ELL students in scientific analysis, creation and enactment, in what it means to "do science".

Figure 3 provides an example of an argument created in response to the guiding question of the example ADI Lab. This example argument is written in English, but the arguments developed by students can be written (and presented) in one or more languages. Here, the evidence consists of an analysis of the data collected during stage 2 and an interpretation of the results. The analysis shows how the temperature of the dark-colored sand, light-colored sand, water, and gravel samples changed over time when they were placed under a heat lamp for 45 min. The interpretation of results explains what the analysis means by highlighting a trend between the nature of the materials and the rate of temperature change. The justification of the evidence in the argument, in contrast, provides an explanation for why the evidence matters. In this case, the justification outlines how thermal energy can be transferred

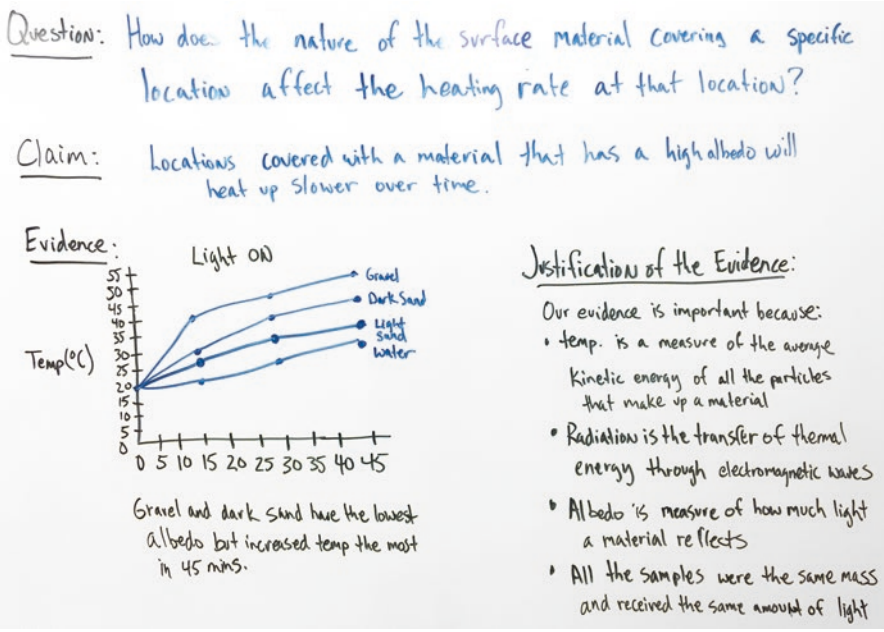

Fig. 3 Sample argument

to an object through radiation, how temperature is a measure of the average kinetic energy of the particles that make up a material, and their assumption that each sample was exposed to the same amount of energy. When students are asked to craft arguments like this in order to answer a guiding question, they not only have an opportunity to learn how to use the core ideas and crosscutting of science to figure out a puzzling phenomenon but they also learn how these ideas can be useful tools for understanding the world around them.

Likewise, integration in peer discussion (Stage 5) allows bilingual ELL students to synthesize new ideas presented via oral evidence (Lee et al., 2013) for use in later written arguments. Free from the pressure of full class presentation (Bunch, 2009), bilingual ELL students engage with scientific discourse in ADI by discussing different ideas and the evidence that supports or contradicts each one with peers in small group settings. During these generative stages, teachers can support bilingual ELL students in creating new scientific knowledge by modeling not only key analytic procedures, but also the necessary language. Here, teachers can provide ample opportunities for their bilingual ELL students to engage in rich meaning making and discussion in science.

Critical to students' overall academic development, the final, productive stages of ADI—***investigative report writing, peer-review, and revision & submission***—provide bilingual ELL students with multiple opportunities to organize and generate academic text for a scientific audience (Stage 6), provide feedback on peers' construction of scientific knowledge (Stage 7), and incorporate feedback to refine and finalize a scientific argument (Stage 8). ADI's reflexive, iterative writing process develops bilingual ELL students' scientific credibility and authority (de Oliveira & Lan, 2014; NRC, 2012; Osborne, 2014). Engagement with expository writing production and its feedback loop is a critical component of the peer-review process, legitimizing bilingual ELL students' entrée into the traditionally white, traditionally male, English dominant discourse of science making and doing. In these final, productive states, teachers can support bilingual ELL students by carefully scaffolding the peer-review and revision processes in particular. These final stages allow the richest opportunities for peer-to-peer interaction, but also require the most careful modeling and scaffolding on behalf of the teacher in order for these stages to remain positive, engaging, and productive. By carefully modeling what peer feedback can and should look like, teachers who provide a clear template for their students to communicate with one another will foster stronger, more positive interactions between the learners, and an environment conducive to rich, productive dialogue that values multiple perspectives.

5 Conclusion

ADI's focus on *figuring things out* rather than just *learning about* has the potential to do more than simply address bilingual ELL students' academic and linguistic development (Valdés, Kibler, & Walqui, 2014). We suggest that it also gives

teachers a way to disrupt the status quo and change what is valued inside the science classroom (Alim, Rickford, & Ball, 2016). Without this critical focus, content-based language instruction alone runs the risk of perpetuating rather than disrupting existing patterns of inequality and exclusion (Hurie & Callahan, In Press; Kubota & Lin, 2009; Motha, 2014). Science writing in ADI, along with viewing bilingualism as a resource or asset (rather than as something to "deal with" or "overcome" inside the classroom) can bolster bilingual ELL students' scientific self-efficacy, positioning them as members of the scientific discipline from the first laboratory experience. While ADI alone cannot combat systemic raciolinguistic discrimination (Alim et al., 2016; Museus, Palmer, Davis, & Maramba, 2011), as a tool it can begin to shift the discourse of the classroom and give all students more opportunities to engage in science processes.

ADI goes beyond typical instructional modifications and vocabulary building (Harper & de Jong, 2004) to actively engage bilingual ELL students' linguistic resources in the classroom. The ADI instructional model is therefore a useful tool for teachers who intend to provide their bilingual ELL students with opportunities to participate in the practices of science while strengthening their English and scientific literacy skills. As researchers trained in bilingual, EL, and science education, we have struggled to merge best practices in science and bilingual education into a useful instructional model. While an integrated language and practice-oriented approach to science instruction such as ADI is certainly a critical first step (Lee & Buxton, 2013; Lee et al., 2013), we are not so naïve as to think that the use of single instructional approach will suffice in improving the learning experiences of all bilingual ELL students (Lucas, Villegas, Martin, & Fives, 2015; Pettit, 2011). We acknowledge that, if done poorly, with little attention to classroom social dynamics, ADI could further ostracize bilingual ELL youth in the discipline of science. Therefore, it is important for all of us, educators and researchers alike, to question our assumptions, refine our instructional practices, and do all that we can to identify and remove the persistent inequities in science classrooms that prevent bilingual ELL students from reaching their full potential.

Reflection Questions

1. How often do your students have an opportunity to develop an explanation or solve problems using the core ideas, crosscutting concepts, and practices of science? Do your bilingual ELL students have the same opportunities as their native-English speaking peers?
2. How often do you give your students an opportunity to make their ideas or reasoning public? How often do you encourage them to work with, critique, or refine their peers' ideas or reasoning once it is made public? Do your bilingual ELL students have the same opportunities as their native-English speaking peers?
3. How often do you encourage your students to talk and write about "what they know" and "how they know?" Do your bilingual ELL students have the same opportunities as their more English proficient peers?

4. What routines, tools, or scaffolds do you use to promote and support reading, writing, and talk inside your classroom? How well do these routines, tools, or scaffold promote or support the development of literacy skills in the context of science?
5. What, if any, social, racial, or ethnic barriers are in place in your school community that limit your bilingual ELL students' access the community of scientific discourse? What can you do to remove these barriers?
6. Do you think your classroom promotes and supports the development or maintenance of a science identity for all students? Why or why not?

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Supporting English Language Learners Through Inquiry-Based Science: Three Strategies for Your Classroom

Joshua W. Reid, Cindi Smith-Walters, Katherine A. Mangione, Alison Dorris, and Terri Tharp

Abstract This chapter uses inquiry-based learning as an approach to discuss three strategies for teaching English Language Learners science content: (a) short silent movies, (b) interactive word walls, and (c) interactive science notebooks. This approach has theoretical grounding in cognitive and social learning theories (i.e., Piaget, Vygotsky, and Cambourne). We discuss the best methods to implement these strategies, suggestions to modify them, as well as the limitations of each. We provide vignettes that focus on natural selection to give context for each strategy. The chapter concludes with a summary of each strategy, a brief discussion on how to combine these strategies for maximum benefit, as well as, questions to reflect on how to promote best practices with these strategies.

1 Introduction

Recommendations and standards for K-12 science teaching and learning advocate for the scientific literacy of students (Next Generation Science Standards [NGSS] Lead States, 2013). Hodson (2009) stated scientifically literate individuals "…must be able to read, write and talk the language of science appropriately, comfortably and effectively" (p. 241). The importance of teaching English Language Learners (ELLs) science is vital due to increasing student diversity, consistent testing gaps, acceptance of new science standards, and the knowledge that all students need to understand science (Buxton & Lee, 2014). ELLs struggle with science and scientific literacy, due to the difficulty of scientific vocabulary (Jackson & Narvaez, 2013).

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Effective classroom instruction must be provided to foster scientific understanding and thus academic success.

This chapter discusses Inquiry-Based Learning (IBL) as an effective instructional strategy to promote scientific vocabulary acquisition in students, especially ELLs. We operationalize IBL strategies as constructivist methods to engage students in metacognition, promote student discourse, and foster higher-order processing skills (Stoddart, Pinal, Latzke, & Canaday, 2002). This chapter presents a rationale for using IBL for teaching vocabulary to ELL students via integrating science and literacy instruction.

We present a description of the three specific strategies of Short Silent Movies (SSM), Interactive Word Walls (IWWs), and Interactive Science Notebooks (ISNs), along with the theoretical underpinnings of IBL from cognitive and social learning perspectives. The chapter includes implementation strategies and an exemplar lessons focused on the topic of natural selection. We also present modifications for teaching further content along with the importance of integrating science inquiry and literacy for ELLs.

2 Approach to Teaching Science to ELLs: Inquiry-Based Learning

Students are diverse – both linguistically and culturally (Lee & Fradd, 1998). For example, students who speak a language other than English in their homes and who may have varying levels of proficiency with English, will make up over 40 percent of K-12 students by 2030 (Collier & Thomas, 2001). Therefore, to be effective, teachers must be prepared to face such diversity (Bruna, Vann, & Escudero, 2007). Science teachers face several issues when planning and implementing instruction for their ELL students and possibly the easiest approach is to integrate the teaching of content (i.e. science) with second language acquisition via literacy (Carrier, 2005; Lee & Buxton, 2013; Lee & Fradd, 1998; Stoddart et al., 2002). Research has indicated that this combination has a much stronger impact on achievement than either alone, particularly with ELLs (Amaral, Garrison, & Klentschy, 2002; Bravo & Garcia, 2014). We become capable speakers of a language when participating in using it for some purpose rather than for its own sake (Roth, 2005). Integrating science literacy and language acquisition has considerable positive impacts on narrowing the gap between ELLs and their English-speaking peers in content area learning (Bruna et al., 2007; Cuevas, Lee, Hart, & Deaktor, 2005).

Learning science is critical so that students not only think and reason, but are able to make informed decisions on scientific and environmental topics locally and nationally. Four strands of science instruction (i.e., understanding scientific explanations, generating scientific evidence, reflecting on scientific knowledge, and participating productively in science) were identified by Michaels, Shouse, and Schweingrubber (2008). Traditional class models (i.e., teacher-centered) follow a

text, lecture, quiz format with teacher led investigations and fail to address three of the four strands. Using science inquiry as an instructional approach allows for all four strands in science classrooms, thus more closely resembling the work of scientists and the Nature of Science (NOS), and promotes student-centered instruction. The best way to foster critical thinking and reasoning is to engage students in the processes of science inquiry.

The National Science Education Standards (National Research Council, 1996) defines science inquiry as:

> The diverse ways in which scientists study the natural world and propose explanations based on the evidence derived from their work. Scientific inquiry also refers to the activities through which students develop knowledge and understanding of scientific ideas, as well as an understanding of how scientists study the natural world. (p. 23)

Science inquiry is more than using a kit for hands-on learning, although kits may serve as a springboard for inquiry. Science inquiry involves some of the same skills as a science fair project, but is more sophisticated than testing a hypothesis and analyzing data. It is systematic reflection of one's ability to generate knowledge, to state, test, and ultimately revise their hypothesis, and perhaps most importantly to *communicate* their findings. The National Science Teachers Association (NSTA, 2003) recommends that science teachers, regardless of grade level, engage in science inquiry with students via planning and implementing an "inquiry-based science program" (para. 5). Teachers are encouraged to create learning environments and to use approaches that encourage exploration of the natural world, provide time for inquiry, and promote students' understanding of what scientists do to learn about the world.

Martin (2000) defines inquiry skills as "… a set of broadly transferable abilities, appropriate to many science disciplines and reflective to the behavior of scientists." Inquiry skills, sometimes referred to as process skills, include but are not limited to observing, classifying, measuring, inferring, predicting, communicating, using numbers, making models, defining operationally, collecting and interpreting data, identifying and controlling variables, forming and testing hypotheses, and experimenting. Learning environments that support these actions is critical to promoting scientific literacy in all students, especially ELLs.

In education, literacy is defined as encompassing reading, writing, listening, and speaking and the ability to make sense of, engage in, and communicate with others on a variety of complex topics. According to the National Council of Teachers of English (NCTE), literacies are "multiple, dynamic, and malleable" (2013, para. 1) and includes verb usage like that of science inquiry skills such as solve, design, analyze, create, and critique. Therefore, integrating science inquiry and literacy is not at odds pedagogically or in practice.

2.1 Three IBL Strategies for ELLs

The integrated activities described below combine science inquiry with best practices in literacy and English language learning and are steeped in social constructivism, which emphasizes the collaborative nature of learning (Vygotsky, 1978). Collaborative methods allow the learners to develop leadership and teamwork skills while scaffolding their learning. These activities encourage student literacy development while engaging them in exploring the science content via science inquiry skills.

Short Silent Movies (SSM) Science teachers traditionally define student collaboration as the work students do with laboratory partners or in groups as they complete investigations and assignments. Peer collaboration approaches require planning and preparation for purposeful grouping: who to collaborate with whom (considering student diversity), grouping/pairing students strategically for success, and assembling thoughtful combinations of students with an eye to friendships and familiarity between and among them. SSM's are a strategy that utilizes the affordances of peer collaboration.

When using SSM's and other peer collaboration techniques, instructors should be attentive to how classroom pairings or groupings can also boost social and academic achievement and how the English-speaking peers play a role in providing language support as the students work through assignments and classwork. This role is often invisible as the students ask and answer questions, paraphrase information, elaborate and provide feedback to one another as ideas during information sharing and discussion.

Interactive Word Walls (IWWs) IWWs build academic content vocabulary, a vital part of science instruction for students like ELLs who struggle with the academic language of science (Jackson & Narvaez, 2013). A class word wall can serve as an effective tool to assist with the acquisition of science vocabulary. Traditional word walls in elementary settings are a group of words displayed on a wall, bulletin board, whiteboard, or poster that are easily viewed and used to assist students with spelling and writing, model high frequency words, spelling patterns and more. The teacher normally determines what words to include.

IWWs extend this idea using visuals and student-led construction of the wall. Visuals may include student generated drawings, pictures, concept maps, graphic organizers, video clips, and physical items. Thus, these visual aids allow students to develop multiple approaches to learning vocabulary and personalize word definitions, by promoting vocabulary knowledge and deeper comprehension (Soto Huerta, 2012). Multimedia such as tangible artifacts, PowerPoint presentations, and interactive smart-boards are excellent IWW tools.

It is not enough to simply display word walls at the secondary level; higher comprehension and understanding occurs when social interaction, active engagement, and student choice are included (Gambrell & Marinak, 1997; Reynolds & Symons, 2001). This allows the learner to associate word features and meanings with familiar

ideas, concepts, and experiences and is actively engaged in multiple, varied, and meaningful experiences with words (Harmon, Wood, & Kiser, 2009). Students build vocabulary knowledge and make connections between the words and their IBL experiences as they construct the IWW and use it to support scientific discourse (Jackson & Durham, 2016).

Interactive Science Notebooks (ISNs) The objective of the ISN is to increase students' science content knowledge and conceptual understanding, to use writing as a part of IBL, and to promote students' ability to link thinking with writing (Young, 2003). ISNs provide students with opportunities to write about their science experiences by discovering and modifying current knowledge and reflecting on knowledge acquired thereby promoting deeper conceptual understanding (Butler & Nesbit, 2008). Such notebooks support differentiated learning by allowing students with diverse abilities (including ELLs) to learn and succeed (Gilbert & Kotelman, 2005).

Using ISNs, the teacher can evaluate individual progress of students and collectively address challenges, concerns, and progress. ISNs provide students with an organized reference for topics covered in class while modeling scientific behavior by accurately recording scientific investigations (Young, 2003). ISNs vary in the type of notebook used (spiral or bound), layout, and mode of representation (paper or digital) (Butler & Nesbit, 2008; Miller & Martin, 2016; Murcia, 2014; Young, 2003). Every student has their own notebook, and all science lessons become a part of this notebook. A table of contents at the beginning and an index of terms are constructed for easy reference. Some teachers also provide a rubric at the beginning (Young, 2003).

Each of these strategies, explicitly described later in this chapter, integrate science inquiry and literacy activities to the benefit of ELL students. Students work together to create meaning and construct higher order understanding of scientific processes and content while developing their English language skills.

3 Theoretical Foundations of the Approach

Inquiry is a powerful way to acquire science content and has theoretical underpinnings in constructivism; a theory used to explain how we know what we know. Constructivists' view learning as a process in which students *actively* construct or build new ideas and concepts based upon prior knowledge and new information (Herr, 2008). The constructivist science teacher implementing inquiry is a *facilitator* encouraging and *guiding* students to discover principals and to create personal knowledge.

Piaget & Inhelder (1969) and Vygotsky (1978) are two constructivist theorists whose theories differ, but both support active construction of knowledge by students. While Piaget's theory focused on the child and their environment, Vygotsky believed the development of understanding was dependent on the social interaction of language and culture, and that this social learning led to cognitive development.

Three key elements to Vygotsky's social constructivism are reflected in our integrated approach teaching ELLs: the zone of proximal development (ZPD), scaffolding, and approximation or guided participation. The first, ZPD, is described as the difference between the learner's developmental level when working independently and their developmental level when working with a teacher or more capable peers. Scaffolding requires the teacher to find the learner's ZPD and involve them with peers on a learning task. Supports are offered and gradually removed as the individual and group increase in their independence. IWWs, ISNs, and SSMs are three ways that these supports can be offered so students become more vocabulary proficient. The final aspect is that of approximation, a process in which learners imitate the behaviors of their models. Approximation allows language development and is particularly relevant to ELLs. Examples include when infants repeat sounds or ELLs mirror the language of peers. The use of approximation by skilled educators means that ELLs will not address listening, speaking, reading, or writing in English as separate activities but engage in integrated language and literacy tasks (Lee & Buxton, 2013).

Children acquire abilities with oral and written language most easily when certain conditions exist in their learning and home environments (Cambourne, 1995). These conditions of learning align with Vygotsky's social constructivist theory and allow ELLs maximum capacity in English language learning. Cambourne's eight conditions and classroom implications form a theory of literacy and language acquisition that can guide all ELL teachers regardless of content area:

1. *Immersion* refers to being "saturated by, enveloped in, flooded by, steeped in, or constantly bathed in that wish is to be learned" (p. 185). For our ELLs, that is science content, science vocabulary, and English.
2. *Demonstration* allows for students to observe "actions and artifacts" (p. 185). This may include teachers modeling scientific phenomena as well as the everyday language used by peers.
3. *Engagement* takes immersion and demonstration further and includes attending to the tasks. This engagement is in part set by establishing the "perceived need or purpose for learning in the first place" (p. 185).
4. *Expectation* are messages communicated to learners. They are "subtle and powerful coercers of behavior" (p. 185). ELL science students must expect to receive the clear message that they are expected and capable of learning English.
5. *Responsibility* refers to allowing the learner personal choice in how they will engage in the learning.
6. *Approximation* means that children are not expected to wait until the language has been mastered before using it. Instead, approximation should be encouraged, thus the learning environment should be free of anxiety and allow the use of word approximations until more conventional English is acquired.
7. *Employment* refers to opportunities we give to learners to use and to practice their developing language skills. This may begin with teachers asking students to respond with physical gestures or a simple yes or no to including ELLs in small and whole group discussions.

8. *Response* refers to the "feedback or information" (p. 185) that learners receive from the learning community because of effort. These responses from teachers or peers, must celebrate learner approximations, reply via modeling the appropriate language, and encourage interaction.

ELLs benefit from a social constructivist and integrated approaches to learning science and English language via inquiry because learning opportunities are authentic and are focused on active meaning-making and problem-solving. Through IBL students engage in personal thinking, discourse, and higher-order processing skills (Stoddart et al., 2002).

The strategies presented in this chapter align with cognitive and social learning theories of Piaget, Vygotsky, and Cambourne. Peer collaboration through SSMs supports ELLs in learning science vocabulary by allowing them a safe space to approximate English language. Peer collaboration is also promoted through ISNs and IWWs and encourages vocabulary acquisition through student choice and autonomy.

4 Implementation of the Approach

Because SSMs, IWWs, and ISNs are encompassed in the cognitive and social learning theories that support knowledge acquisition, the following section provides specific instructions regarding each strategy and implementation suggestions which include a vignette of a foundational concept in the teaching of evolution: natural selection. We discuss modifications and limitations of each strategy and provide additional resources for each in a table at the end.

Implementation: SSMs Good inquiry requires conversation, either between the teacher and student or between and among students themselves. SSMs allow students to build conceptual understandings as they talk, share, and discuss a science concept. For example, many students recognize the idea of survival of the fittest. Often, they believe this only applies to prey species and/or the phrase means the largest, most fierce, fastest organism will have better chances of survival. They seldom realize that fitness may describe the organism that is smallest, has the best disease resistance, or can hide regardless if they are predator or prey species. Instructions for implementation of the short silent movie strategy are below:

1. *Choose a video or video segment that is no more than five minutes in length*. Several high-quality videos are available from *The Shape of Life*, a PBS series. For our example, we have chosen a short clip on octopuses from the series http://shapeoflife.org/video/molluscs-octopus-camouflage. These creatures have no shell in which to hide, so they use camouflage as a means of defense. In a short two-minute video, a few of these creatures rapidly change in color, texture, and appearance.

2. *Turn the sound off/down and show the video clip.* We begin 10 seconds into this video. This ensures that no words are displayed on the screen prior to the segment students view so titles and narrative do not influence viewers.
3. *Stop the video and have student pairs or small groups discuss what they have seen.* The first few times using this strategy you may wish to offer discussion prompts to foster discussion. Provide 5 to 15 minutes for sharing. The amount of time offered will depend upon several factors including video subject and length, amount of student engagement, and prompts that may or may not be provided. We have found that students are unsurprisingly interested in the natural world and for some clips we bring the discussion to a close while discussion is at its high point. Because of the lack of narration, students become close observers of what they view. They use their own words and together build vocabulary that helps to explain what was witnessed. As student pairs or small groups discuss, all are responsible for taking notes, asking questions and attempting to answer their own questions, as well as predicting what happens next. The teacher does not provide language or vocabulary because it will organically surface as pairs and/or small groups share the experience.
4. *Bring the group conversations to a close and facilitate a class discussion regarding the video clip.* The students or teacher can write vocabulary, questions, and other information on the board. Are groups thinking alike? Have they posed questions that can be answered by other groups? Are there questions that the class cannot answer? Are students in agreement with one another or are there views that conflict? The rich discussion that arises in both small group and class discussions enables learners to make sense of the world around them as they learn the language of science.
5. *Play the video again; turn on/up the sound and listen to the narration that accompanies the visuals.* Another pair/small group sharing session may follow this. Are there gaps in information students have in their notes? Are students' questions answered? Do additional questions arise? Be aware that it is common for students to ask to view additional segments of the video or to see the entire video. Whether you choose to do so is a matter of personal preference.

Language and literacy courses, as well as science courses, can utilize the short silent movie strategy. It provides a way to support language acquisition as it promotes higher order thinking skills and conceptual understanding regardless of language abilities. Academic language spontaneously develops through discussion and conversation. Research (Clark, Nelson, Atkinson, Ramirez-Marin, & Medina-Jerez, 2014) supports that ELL students especially benefit from the incorporation of science content, language scaffolding (support), and technology. As students switch between English and their native language they learn and build personal understandings in a meaningful way.

An additional caveat is that, depending upon the field of science being studied and the video used, it is quite possible to incorporate and reinforce many of the basic science inquiry skills. For our natural selection activity, students use the skills of observation, classification, inferring, predicting, communicating, and defining oper-

ationally. This is an excellent educational return on a short investment in a class video of approximately two minutes and accompanying discussion among students. An additional biology example includes a time-lapse video of seeds germinating and/or of seedlings as they grow and move toward the light is shown. Many students do not believe plants move and seeing a seedling growing and moving is eye opening for them and provides a rich backdrop for vocabulary acquisition and expansion.

Modifications SSMs are easily used in a variety of science content areas (chemistry, physics, physical science, earth science, astronomy) and videos on concepts and ideas are freely available and easily found via an Internet search or by talking with colleagues who also teach content courses. As educator's plan these lessons and seek appropriate videos, they will spontaneously plan to teach a language lesson as well as a science lesson where students build language and science literacy in a very organic way. Variations for this approach exist in the literature. One the reader may find of interest is that of pedagogical subtitling (Danan, 2004; Talavan & Rodriguez-Arancon, 2014). In this variation, pictures or videos are subtitled. This captioning helps ELLs visualize what is heard and can increase language comprehension and depth of processing.

SSMs can be used to introduce a concept which may encourage students to complete accompanying readings in the text and find information on their own. Additionally, incorporating this strategy for teaching science content may also motivate and engage students in the reading process (Elliot, 2007). SSMs are also an excellent way to end a unit and have students self-check their understanding.

Considerations and Limitations Although numerous videos are available, it takes time and effort to identify useful videos and clips. Many on YouTube for example, incorporate written words on the screen, which, in our opinion, reveal too much information. We want students to think deeply and believe the words and/or titles are too leading or revealing.

It is important that groups report-out and/or discuss the information in the large group and that the instructor facilitates this discussion. Peers have teaching advantages unavailable to you as the teacher, but if they are passing along incorrect information this can be costly to the learner. An overall class discussion helps to avoid errors.

Implementation: IWWs To begin an IWW, students might brainstorm words through an introductory learning segment such as homework feedback, initial classroom discussions, responses to required readings, and/or peer collaborations. This allows the instructor to ascertain the basic background knowledge of students regarding a topic such as natural selection. This informal pre-assessment enables instruction planning. As class readings, discussions, and learning occurs, students and the teacher identify key content vocabulary to include on the IWW, determining how to organize and add key words and visuals. Teachers can support student understanding by providing a concept map template, sentence starters such as "an example of natural selection in nature is…" pictures, etc. These ancillaries particularly assist ELLs because they provide ELLs with the opportunity to make connections

between their native language and understanding and the English language and understanding. However, all students participate in constructing and adding to the wall as they learn information. The wall can then be used as a reference point and continually refined for the students' ISNs and class activities. Fig. 1 provides an example of an IWW.

Modifications IWWs can be an actual classroom physical display, but a virtual word wall on an interactive whiteboard, Padlet, Chromebook or other such devices allows diverse multimodal opportunities (Wong, 2014). Virtual IWWs are a technology-enhanced alternative providing an option to link to bilingual dictionaries, video clips, an online ISN, and other hyperlinks. This provides ELLs with additional supports to access and learn the science vocabulary in a mode that works best for them. As a formative assessment, all students could use the wall as a word bank for a quiz before a cumulative assessment.

Considerations and Limitations This effective strategy does require planning and attention (Jackson, Tripp, & Cox, 2011). While students generate many of the vocabulary words, teachers must help organize the information to ensure that key concepts are included and that misconceptions are addressed and corrected. Those who teach multiple sections must also determine whether to have word walls for each section to directly differentiate instruction for each class or have a general

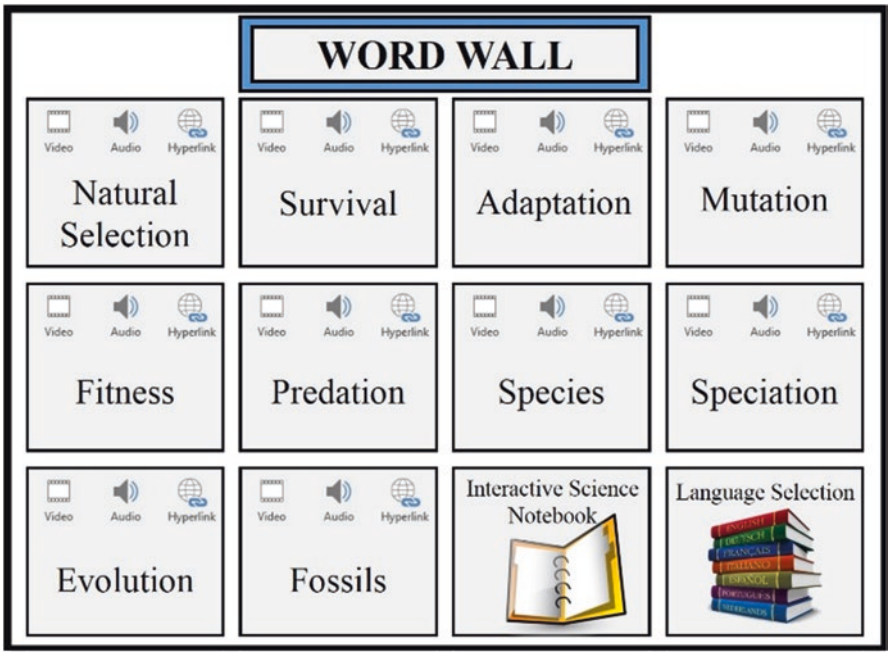

Fig. 1 Exemplar IWW for teaching natural selection

word wall for all sections of the same subject for easier management. Other challenges might include wall space and/or technology access, supplies and materials, and how long to use and then rotate IWWs (Jackson & Narvaez, 2013). We recommend the rotation of IWWs as core concepts rotate in the curriculum. For example, the IWW for natural selection may rotate out when the curriculum shifts from evolution to microbiology.

Implementation: ISNs ISNs are easily adapted and used at any grade and in any content area (biology, chemistry, or physical science) by changing the vocabulary, notes, and activity, and providing students with content and ability-appropriate writing prompts. The example format for ISNs provided in Fig. 2 is adapted from studies that used notebooks and journals aimed to create a student-centered learning resource to promote student success, including ELLs (Sibold, 2011; Towndrow, Ling, & Venthan, 2008; Young, 2003).

Regardless of construction, the teacher must be well prepared so that ISNs are beneficial to students and not merely an assignment. By creating a notebook of several upcoming completed lessons, the teacher can stay ahead of students while also providing an example for students.

ISNs use both the left and right hand side of the notebook and employ three sections: academic vocabulary and notes, scientific investigation or activity, and journal entry. The academic vocabulary and notes section is on the right-hand side, the scientific investigation or activity section on the upper left-hand side, and the journal entry on the lower left-hand side.

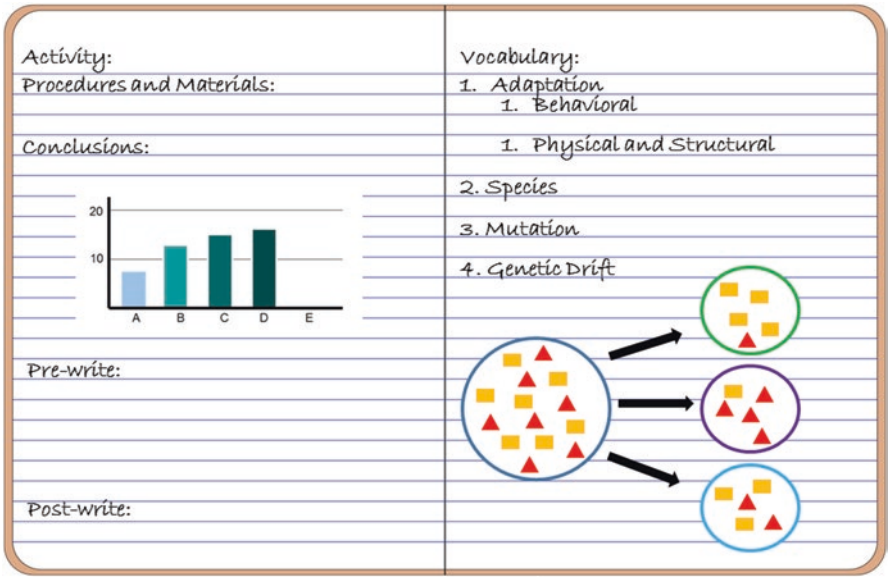

Fig. 2 Exemplar of an ISN

Academic Vocabulary and Notes: Right-Hand Side This section contains vocabulary and/or notes pertaining to the lesson. Within this section, students may write vocabulary words, definitions, descriptions, examples, pictures, and related vocabulary. Students may define vocabulary such as population, species, adaptation, natural selection, and evolution and include notes that pertain to the lesson of natural selection.

Scientific Investigation/Activity: Upper Left-Hand Side This section includes information regarding the scientific investigation including title, goal and purpose, questions proposed, the procedure (materials, steps, and data collected), and conclusions. Students can attach supplemental materials pertaining to the investigation such as graphs or tables, laboratory reports, or drawings to the upper left-hand side.

Journal Entry: Lower Left-Hand Side The journal entry provides an opportunity to reflect on acquired knowledge and learning and is divided into a pre-write and post-write. The pre-write occurs prior to instruction and allows students to write about current knowledge, understandings, and beliefs concerning the topic. This also serves as an opportunity for students to ask questions. The pre-write introduces the topic of natural selection and permits the teacher to recognize current knowledge of the topic.

The post-write occurs after instruction and the scientific investigation. Layout is like that of the post-write. The teacher may provide a topic-appropriate writing prompt or several questions. Students may try to answer their own questions proposed from the scientific investigation, activity, or journal entry pre-write. The post-write journal entry gives students the opportunity to demonstrate their understanding of the concept and provides a formative assessment on student progress from the pre-write entry. A benefit of this aspect of ISNs is that ELLs can write in their native language which has been shown to promote student understanding of the science content (Manz, 2012).

Modifications Depending on technology access, students can create digital ISNs (Miller & Martin, 2016). Multimodal representations of the notebook create "opportunities for students to experience knowledge and demonstrate what they know in an increasing range of modes" (Murcia, 2014, p. 77). The affordances of digital ISNs also includes the ability for easy sharing of data and work among students and teachers, enhanced visualization of data, and engaging opportunities for students (MacKinnon & Williams, 2006).

Considerations and Limitations Careful selection of vocabulary should be considered to limit use of words with multiple meanings and "complex argument structures" (August, Carlo, Dressler, & Snow, 2005, p. 55). In addition, the teacher must ensure the science notebook is student-centered; a tool for ensuring conceptual learning and understanding, rather than merely an assignment comprised of questions, ideas, and beliefs that the student thinks the teacher wants to see (Fulton & Campbell, 2004).

Table 1 Additional resources

Strategy	Links and resources
SSMs	http://www.openculture.com
	http://www.teachwithmovies.org/snippets-index.html
	http://www.sciencechannel.com/videos/
	Other sources: National Public Television, National Park Service, Department of Agriculture
IWWs	https://www.youtube.com/watch?v=qGujpt_-3Pc
ISNs	**Non-digital**
	https://www.youtube.com/watch?v=Cr898o3mXP8
	https://www.youtube.com/watch?v=TfZtvc61ZD4
	Digital
	https://www.youtube.com/watch?v=IL-x2mwlnO4
	http://www.kaysemorris.com/guide-to-using-digital-interactive-notebooks/

Table 1 provides additional resources for each of the three strategies we have shared here.

5 Conclusion

Current reform efforts advocate for the development of scientifically literate students. However, science learning has a multitude of barriers that prevent students from being successful learners. One barrier is a limited understanding of the complex language of science. This is even a greater concern for ELLs because they have a need to learn English as well as the language of science.

This chapter presented three inquiry-based strategies to teach natural selection. Each promotes IBL: (a) SSMs, (b), IWWs and (c) ISNs. Natural selection was the topic chosen to illustrate these strategies, but any cross-disciplinary and cross-content instruction can be achieved as promoted in the NGSS (NGSS Lead States, 2013).

In addition to the cross-disciplinary aspect of these strategies, the coordination of each approach promotes optimal learning of the language of science. For example, a 3-day lesson could incorporate the ISNs throughout all 3 days. SSMs may introduce a unit and IWWs could be used for formative assessment. Day three could incorporate peer collaboration through discussion of the ISNs and IWWs. Individual instructors should take the strategies and modify as needed for their learners. Even in a student-centered classroom, the additional use of these strategies will further support inquiry and the science language and knowledge acquisition of ELLs.

Reflection Questions

1. This chapter presented three strategies to IBL. Reflect on how your classroom environment supports the uses of these strategies. How could you incorporate them into your classroom and how can you use these strategies to teach "cross-cutting concepts" as indicated in the NGSS?

2. There are many ways to define science inquiry. Think about the three strategies presented in this chapter. How do these align with your personal definition of science inquiry? Provide specific examples of how you currently support science inquiry in your classroom.
3. What small steps can you do to implement these strategies?

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Engaging English Language Learners in Model-Based Science Instruction

Magdalena Pando and Zenaida Aguirre-Muñoz

Abstract A model-based instructional approach offers English language learners instruction that integrates content and language to provide them with linguistically rich opportunities while learning science. This approach allows ELLs opportunities to construct models as hands-on activities to represent some aspect of reality. Language practice opportunities using the language of science are provided for ELLs to evaluate and defend their model constructions through oral and written argumentation. Science instruction through this approach ensures ELLs are provided with learning experiences that mirror the social practices of scientists, such as conducting inquiry investigations, constructing models, evaluating models and creating arguments to communicate experimental findings. In this approach, ongoing assessment is important to provide continuous feedback to students on their content and language learning. Rubrics developed in model-based instruction offer an alternative assessment method to measure ELL performance in science language use.

1 Introduction

Integrating content and language is essential when teaching science to ELLs. Model-based teaching engages students in observation, imagination and experimentation, reasoning and representation of phenomena through modeling. A critical stage in modeling is model evaluation. Model evaluation is a process that provides students with linguistically rich opportunities to use purposeful language for making sense of their models (Pando, 2016). Students explain and create arguments to defend their model constructions and to justify how their model fits an aspect of

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reality or a science phenomenon. This is a language intensive practice that requires careful scaffolding and monitoring of student progress. Thus, we argue for the integration of language instruction into the science teaching to produce purposeful oral and written texts to communicate complex meaning. However, such an approach requires alternative assessment methods that capture student progress in approximating the language for representing knowledge scientifically.

Alternative assessment is necessary in model-based teaching because traditional assessment methods are not designed to provide specific information about the students' ability to represent scientific descriptions, arguments or reasoning. To be useful for planning and communicating progress to students, more specific information about language use should be communicated to students. Alternative assessments support this shift in focus because, if designed well, they serve as a means to gain important information about students' academic and linguistic development within specific content domains (Herman, Aschbacher, & Winters, 1992). To be useful for teachers, they must also be tools that can be used within the context of instruction and easily incorporated into daily activities (Hamayan, 1995). Although alternative assessments take many forms, the main goal is to "gather evidence about how students are approaching, processing, and completing real-life tasks in a particular domain" (Huerta-Macias, 1995, p. 9).

2 Approach to Teaching Science to ELLs: A Model-based Instruction

In teaching science, one must consider the social practice of scientific communities, which includes the manner in which language is used in scientific texts. Conducting investigations and making sense of information gathered is required for informing the scientific community and is precisely what should occur in the science classroom to mirror the social practice of science communities. Therefore, teachers must provide ELLs with science instruction that integrates both content concepts and language communication skills that are consistent with communication in scientific communities.

This approach utilizes modeling to conduct and make sense of investigations. Modeling provides ELLs with hands-on activities that allow them to "do" science through model constructing as they conduct observations, experiment, gather and analyze evidence to make sense of their investigations. Through cooperative learning strategies and small-group activities, ELLs evaluate their models by using explanatory and argumentative text types that engage them in science talk. However, prior to using explanatory and argumentative text types, ELLs require explicit language instruction and scaffolding to make claims, select relevant evidence, and to reason about how data support claims.

Model-based instruction provides opportunities to learn science as a process of inquiry through observation, imagination, and reasoning about phenomena. These

opportunities allow students to reason about theory and data by coming into direct contact with phenomena through the application of scientific principles (Pando, 2016). McNeill and Krajcik (2011) identify reasoning as a justification link between evidence gathered through observation and experimentation that supports a claim. The reasoning component often requires the discussion of appropriate scientific principles to explain this link. ELLs require linguistic scaffolding and language practice opportunities in order to reason to make a justification link between evidence and their claims. Thus, ELLs should be encouraged to interact in science talk in small-group academic conversation and whole-group discussion. Thus, through modeling (constructing and evaluating models), students mirror core knowledge-building inquiry activities of scientists, such as organizing knowledge and what is to be learned, generating models, seeking evidence, and constructing arguments (Windschitl, 2008).

2.1 Modeling and Language Use in Science Learning

All students require practice for "doing" science and informing the science community (which, for them, may be the science classroom). A model-based with language use approach provides students with essential scaffolding to support doing and communicating science. Science learners require classroom spaces that are designed to engage them in inquiry-based science learning. Simultaneously, students require explicit instruction with exploring the text types used in science for sense-making and communication of investigation findings. Thus, linguistic scaffolding for using explanatory and argumentative text types is necessary.

Modeling provides students with the experience of visually representing and communicating knowledge about specific phenomena. Models may be in the form of drawings, physical constructions, symbolic expressions or simulations. Scientific modeling is a process for constructing, using, evaluating, and revising scientific models. Justi and Gilbert (2002) propose the modeling process to consist of four central stages: (1) producing a mental model, (2) expressing the model, (3) testing the model, and (4) evaluating the model based on the intended purpose and whether that purpose has been satisfied. Modeling provides ELLs with hands-on practice to experience organizing and communicating their knowledge about science phenomena.

2.2 Modeling Strategies

This instructional approach utilizes modeling as a process for science learning and includes abundant opportunities for hands on activities to construct models. Models provide opportunities for purposeful representation of some aspect of reality as students are expected to specify the intended representation behind their models, gather

evidence in support of their models, test, evaluate and re-test their model until the scope of their model fits the correspondence to the aspect being represented. In addition to being hands-on, physical constructions of represented knowledge, models are a visual representation of how students interrelate concepts.

2.3 Language Strategies

Coupled with modeling, content-specific language strategies provide ELLs with meaningful language practice opportunities to discuss and explain their model constructions and their intended purpose. As mentioned previously, science learners require explicit language instruction for making claims, talking and writing about evidence, and justifying why evidence supports claims. One way this can be accomplished is through the use of sentence frames for making a claim about a science phenomenon. Sentence frames are a scaffolding strategy that provide a few key words or phrases as a sentence starter or builder to guide students towards generating a response to a question or comment. An example may be, *Elements and compounds are… One is…The other is…* as sentence starters for developing a response to the following question: *Are elements and compounds the same?*

When linguistically accommodating the needs of ELLs, purposeful questioning and sentence frames provide effective scaffolding techniques that guide ELLs to make initial claims and guide them to talk about evidence in support of their claims. Word banks also become effective tools that provide ELLs with the content-specific nouns, verbs, and adjectival phrases for explaining their models. Take for example the previous sample question: *Are elements and compounds the same?* A response to this question could be: *Elements and compounds are not the same. One is a substance made of one type of element while a compound is composed of two or more elements that are chemically combined.* A purposeful word bank could include specific nouns such as *elements*, *compounds*, *substance*; verbs, *are*, *is, made of*, *composed of*, *chemically combined*; adjectival phrases, *not the same*, *two or more*, *chemically*.

2.4 Language of Science

Model-based instruction through purposeful language provides ELLs with opportunities to engage in science communication similar to how scientific communities engage in discourse, through arguments and explanations and extensive use of models. By providing students with explicit language instruction to make claims, talk/write about evidence, and justify through reasoning while conducting inquiry, ELLs become agents of science talk. Within this instructional approach, ELLs engage in model evaluation through explanation and argumentation to determine whether their models fit the correspondent aspect of reality or phenomenon they are

representing. When doing so, ELLs present claims along with their models as an answer to a question. For example, a question may be, *do elements and compounds containing oxygen exhibit identical physical properties*? A claim answering this question could be: *Oxygen and H_2O do not exhibit identical physical properties*. A model would serve as a representation of different substances exhibiting different properties due to their atomic and molecular composition or structure.

Instruction produces opportunities for models to be tested through observation and experimentation to collect and analyze evidence in support of initial claims. Experiencing observation and experimentation should precede talking or writing about evidence. Based on the initial claim about oxygen and water not exhibiting identical physical properties, inquiry experiences should target an examination of the properties of oxygen. Experiences to collect evidence on the physical properties of water and oxygen provides students with concrete and meaningful experience to talk/write and whether this evidence supports/fails to support their initial claim. Contrastingly, atomic arrangement and particle motion would serve as scientific principles students could apply in justifying why their evidence supports or rejects their claim. When students gather evidence that rejects a claim, they can reason to rebut why evidence do not support initial or alternative claims. The values of this approach are the multiple opportunities afforded to ELLs for "doing" science and modeling to represent phenomena, which then supports extended use of targeted language. Through modeling and explicit language instruction of language resources, students employ the language of science as in the social practice of scientific communities.

2.5 Assessment of Authentic Scientific Communication

Approximating the discourse of science communities is no easy task; it requires frequent and specific feedback on their language output. Since alternative assessment is performance based, it reinforces the idea that the point of language learning is communication for meaningful purposes. While extant research on ELL assessment practices has resulted in more debate than consensus on elements of effective assessment models (Aguirre-Muñoz, Amabisca, & Boscardin, 2009), alternative assessment methods work well in inquiry classrooms because they are based on the idea that students can evaluate their own learning and learn from the evaluation process (Herman, et al., 1992). As a result, alternative methods give learners opportunities to reflect on their linguistic development and their learning processes (what helps them learn and what might help them learn better). Two key features of alternative assessment that support monitoring both language and content development include the focus on: (a) demonstrating learners' abilities to accomplish communication goals and (b) communicating authentic purposes, not right and wrong answers.

Successful use of alternative assessment in this approach to science instruction, however, depends on using performance tasks that allow students to demonstrate

what they can do with language. Fortunately, many of the activities that take place in an inquiry classroom advance this type of assessment in that inquiry classrooms mirror the kinds of ways of doing and knowing encountered in scientific communities.

2.6 Communicating Expectations

Assessment tasks and scoring criteria communicate expectations to teachers, students and communities. They communicate what is valued, what deserves focus, and what is expected as good performance (Herman et al., 1992). We center our examples of assessments on checklists and rubrics because they facilitate communicating the language and content expectations to students. Checklists are often used for observing performance in order to keep track of a student's progress or work over time. They can also be used to determine whether students have met established criteria on a task. A rubric provides a measure of quality of performance on the basis of established criteria. Checklists can be useful for classroom assessment because they are easy to construct and use. However, they are limited in that they do not provide information of the relative quality of a student's performance. Well-written rubrics do focus on the quality of the performance and are often used with benchmarks or samples that serve as standards against which student performance is judged.

Whether checklists or rubrics are used as scoring schemes for language and content use, they should signal the importance of demonstrating command of the register needed to produce claims, evidence, reasoning, and argument as well as the degree of conceptual development that is displayed by the performance.

3 Theoretical Foundations of the Approach

3.1 Theory of Modeling

The modeling process consists of four central stages for representing an aspect of the world for a specific purpose: (1) a mental model production; (2) expressing the model; (3) testing and re-testing the model; and (4) evaluating the model (Gilbert & Justi, 2016). Within a model-based perspective to science instruction and learning, there is a semantic view to science theories. The semantic view is oriented more towards scientific practice, where multiple components are related to represent certain aspects of the world (Giere, 1988, 1999, 2004; Suppe, 2000; Van Fraassen, 1980). These multiple components are an agent (representor), a model (representation), an aspect of the world being represented, and a goal and purpose for representing. This view juxtaposes with what traditional science instruction looks like,

where theories are treated as statements of universal scope (Develaki, 2007). This traditional perspective treats theories as immediate descriptions of reality, whereas modeling treats theories as science principles that are only represented through models that have been tested and evaluated in terms of model fit to some aspect of the world. In the model evaluation stage, models are tested and critiqued through explanation and argumentation to identify the scope and limitations of a representation for ongoing inquiry investigation. A model-based perspective transforms traditional science instruction, where knowledge is transmitted as a static body of facts, into knowledge that is constructed/co-constructed through a continued social practice of inquiry and further discovery.

3.2 SFL Theory for Sense-making

Systemic Functional Linguistics is the theory of language that informs model-based instruction in this approach. Halliday (1993) suggests that language is the theory of human experience. The theory enables us to use language as a semiotic tool and to consider the role it plays in the demands and challenges of schooling (Schleppegrell, 2004). Knowledge of register (language in context) requires knowledge of context and the linguistic resources that instantiate meaning across different contexts. SFL as a theory of language is a framework that requires knowledge of contextual variables such as field, tenor and mode realized by language metafunctions for sense-making. The three metafunctions of language are: (1) ideational – how language is used to represent personal experience of the world; (2) interpersonal – how language is used for interaction; and (3) textual – low language is organized into cohesive and coherent texts. In SFL, field is the contextual variable that includes what is talked or written about, tenor refers to how language is constrained by the relationship between speaker//listener and or writer/reader and mode determines the expectations of how specific text types should be organized. Together the contextual variables of field, tenor, and mode are realized by the three metafunctions of language as register for making and communicating meaning across contexts.

3.3 Representation and Sense-making

While modeling provides students with opportunities to engage in inquiry, representing for a purpose and explaining a phenomenon is required for informing science and sense-making. Thus, two constructs are considered, experience (field of reality) and representation for sense-making. How we experience an aspect of reality and how we represent to make sense of it is realized through use of our linguistic repertoire. Representation requires an aspect of the world or reality through modeling. Coupled with language, model constructing and evaluating capture the essence of representation through construction of scientific explanations and argumentation.

Integrated modeling and functional approaches to language use in science teaching offers ELLs meaningful practice that mirrors the social practice of scientific communities and affords them equitable and quality learning opportunities while acquiring a second language.

Assessment of the language model utilized for scaffolding explanations should include information about how ELLs use the language expectations in making claims and in presenting evidence, and reasoning. The claims and evidence portion of the model correspond to written explanations and the reasoning portion corresponds to written arguments. Table 1 (adapted from Humphrey, Droga, & Feez, 2012) below presents key similarities and differences in register features between these two text types organized by contextual variables.

Table 1 Key similarities and differences in register

Contextual variable	Explanation	Argument
Language for expressing ideas-field	Action verbal groups to present events;	Relating verbs to present reasons and explain causes and consequences
	Relating verbs ("to be" verbs) to refer to cause and effect in causal explanations	Action verbs (typically in the present tense) to provide examples of causes and consequences
	Simple present tense to indicate generalizations	Sensing verbs (e.g., i feel, i think) to make explicit personal opinions (in less mature arguments)
	Relating to identify phenomena	
	General, abstract, technical, non-human nouns	
	Extended noun groups with factual adjectives and classifiers to describe phenomena	
	Adverbials and dependent clauses to express details (e.g., place, extent, manner)	
Language for interaction-tenor	Statements expressed as declarative clauses with few evaluative resources	Evaluative vocabulary, especially judgment and appreciation
		Rhetorical resources for acknowledging and rebutting alternative positions (e.g., concession, modality, attribution)
		Interpersonal metaphor used to express opinion a less straightforward, implicit way (e.g. *It is clear that*...)
Language for creating cohesive texts-mode	References to time in theme position in sequential explanations	Text and paragraph openers and some text connectives to signal where the text is headed
	References to cause and effect in theme (complete subject) position	Zig-zag theme patterns to connect and elaborate on ideas from previous sentences
	Passive voice to foreground the object undergoing the action	
	Nominalization (linguistic metaphor) to summarize events and name abstract phenomena	

4 Implementation of the Approach

Implementation of the model-based language approach requires a constant interplay between "doing" and "talking" or "writing" science. To better explain the approach, we will use the examples of classifying matter, identifying chemical changes as evidence of a new substance formed through a chemical reaction, and testing the physical properties of matter.

Prior to beginning implementation, teachers would identify an underlying scientific principle that treats the above concepts relatively. In our example, the scientific principle that interrelates targeted concepts is *particle arrangement and motion determine the composition of matter and its physical and chemical properties, and that anytime there is a molecular rearrangement, matter exhibits different properties due to the formation of a new substance through interactions and exchanges between matter.* Conducting investigations designed to call attention to this scientific principle allows teachers to create classroom instruction and activities where students have opportunities to ask questions, make observations, make claims about matter, experiment, test and gather evidence to represent their experience with the language of science and modeling for sense-making.

4.1 Constructing Models/Field Context

One foundational lesson for learning how to classify matter is differentiating between elements and compounds. Chemical symbols from the periodic table are used to represent elements and chemical formulas are used to represent compounds. The language of chemistry makes use of this symbolic language as the nomenclature for identifying different substances. The language is abstract and technical for students when they are expected to differentiate between elements and compounds using such nomenclature. Contrastingly, a physical model offers a visual representation of elements and compounds as a concrete experience that helps students visualize the arrangement of atoms in elements, compounds and mixtures. Multi-colored marshmallows and toothpicks are some model constructing components that may be used to represent how elements, compounds and mixtures are arranged at the atomic level. Teacher modeling for constructing physical models of matter provides ELLs with a visual representation of the symbolic nomenclature of specific substances. The challenge in providing concrete experiences to students is that phenomena are often too small to be seen with the human eye, processes take thousands and millions of years to occur, or processes happen in all directions such as in energy transfer and transformations. Thus, models are frequently used to teach about processes and phenomena too small to be seen or too far to be measured (such as objects in space).

Taking the approach of modeling phenomena too small to be seen as in atoms in elements and compounds requires purposeful teaching and planning. It is important

to select purposeful content objectives. Echevarria, Vogt, and Short (2004) highlight the necessity of lesson planning to include concrete content objectives that identify what students should be able to do. Combined with modeling, the content objective can become the purpose or goal for modeling some aspect of the world. Consider the content discussed thus far. A modeling content objective may be: *Students will construct a model to differentiate between elements, compounds and mixtures*. Equally important is the argumentation that will occur in the evaluation stage of the modeling process. Language objectives then should also be clearly communicated to students. A language objective may be: *Students will orally describe how they differentiated between elements, compounds and mixtures.* Much of the research around modeling and model evaluation documents that before students are able to use explanatory text types they will employ illustrative text types (Schwarz et al., 2009). Recalling the field contextual variable determined by the inquiry experiences of learners, utilize the experiential function of SFL to provide students with the content language necessary to talk about matter in the selection of strategies. Examples of participants and noun groups specific to building this specific model on differentiating matter may include: elements, compounds, mixtures, atoms, H_2O (Water), O_2 (Oxygen), $CaCO_3$ (Calcium Carbonate or Chalk), toothpick, and marshmallows (different colors). The list then serves as a word bank or language resource for lexical choices to scaffold the content that is to be modeled and later used in oral or written texts. Venn diagrams and concept maps are excellent graphic organizers that scaffold organizing knowledge about differentiating types of matter prior to constructing a model. Venn diagrams are ideal for comparing and contrasting as would be required to differentiate between elements and compounds. Concept mapping is a tool used to organize and represent knowledge (Novak, 1990) and require links made between concepts to explore relationships.

4.2 Explaining Models/Tenor Context

A visual representation or a physical model is insufficient for sense-making. While a student constructs a model for differentiating between elements, compounds and mixtures, an audience attempting to decode what the model represents will be at a disadvantage if what is being modeled and for what purpose is unknown. Additionally, every student may model differently and modeling perspectives affect representation. Thus, it is important that a model be coupled with an explanation or an argument supporting model fit to an aspect of the world to ensure representation is communicated to an audience or other students. Consequently, model evaluation is heavily dependent on explanation and argument text types. To best explain this, let us consider the following two-dimensional model representation of how a student may build a model to differentiate between elements, compounds and mixtures (Fig. 1). Within this model, each shape represents a different element. A toothpick represents two different elements chemically combined to form a compound. The three-fourths pies and the square frame shapes are different elements mixed together

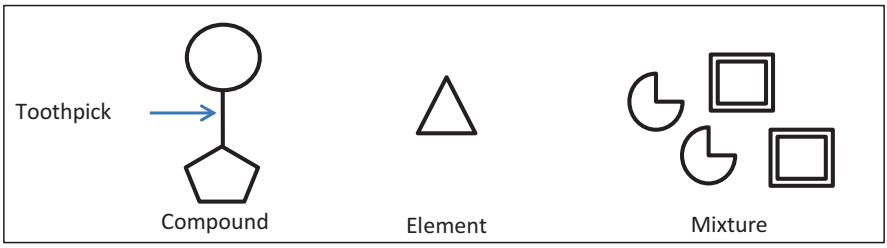

Fig. 1 Elements, compounds, and mixtures model

but are not chemically combined. Without this information and labeling within the model, an observer would find it difficult to comprehend.

Implementation of this approach must consider the role language plays in the model evaluation stage. For this to occur, instruction must include opportunities for students to interact with each other to orally describe and/or explain their models in small group conversations. This process engages students in agreement or disagreement about modeling, and students acknowledge and appreciate varying perspectives in representation; students also acknowledge scope and limitations of their models and consider ways for revising them. These interactions provide meaningful language practice opportunities amongst ELLs and between ELLs and English speakers for constructing scientific explanations.

Teachers can target science discourse instruction to engage students in argumentation when explaining their models in small groups. Recall the aforementioned language objective: *Students will orally describe how they differentiated between elements, compounds and mixtures*. Description is a good source for scaffolding explanations. Descriptive linguistic choices highlight the participants in a text. Consider a descriptive sentence from a student describing Fig. 1 as their model: *The toothpick is holding those two together, so it's a compound.* Besides being physically attached, conceptually the student does not say anything more. Let us reconsider the language objective to be instead: *Students will orally explain to a partner why they have used a toothpick to differentiate between elements, compounds and mixtures*. This is much more purposeful for explaining the modeling. To explain models requires explicit language instruction. Students require knowledge on making claims, talking about evidence and justifying through reasoning. Accomplishing this requires knowledge of specific text types present in the language of science.

4.3 Explanations

Explanations in the language framework provided begin with an initial claim that introduces the topic and relationship between topic and phenomenon. Remembering that a claim can be an answer to a question, academic-specific questioning is necessary when implementing this approach. A question to pose may be, *how do you*

classify the different types of substances in your model? An initial response in the form of a claim may be the following example: *The model classifies substances intro three types: compounds, elements and mixtures* (referring to Fig. 1). The next step would be to talk about evidence supporting their claim. In this case, students are provided with symbols and formulas that represent numbers of atoms in elements and compounds. After scaffolding content, students would learn that compounds are chemically combined together through specific bonding, ionic or covalent. Furthermore, they learn that mixtures are physical combinations that can either be classified as heterogeneous or homogenous. Finally, explanations include a reasoning component that justifies why evidence gathered and analyzed supports or rejects claims made. This justification made through the reasoning component completes an explanation and is coupled with a model to engage in science argumentation with other students. Word banks, concept maps, semantic maps and models become scaffolding tools for the construction of explanations and arguments.

4.4 Oral and Written Texts/Mode Context

Students require content specific language strategies that will aid them in constructing and organizing cohesive texts, spoken or written. When considering the field contextual variable, linguistic choices are provided in the form of nouns and noun groups as participants of the language function to express what will be talked or written about. The tenor contextual variable includes the interpersonal language function to take particular positions, relay a point of view, and moderate the meaning ELLs make in statements. The mode contextual variable includes use of the textual function in selecting cohesive and organizational language for sense-making. Thus, word banks that include specific sensing verbs (see, feel, hear, etc.) and modal verbs (should, must, will) are science discourse scaffolding tools. Modal verbs scaffold expressing weak to strong expressions of point of view, whereas sensing verbs scaffold talk or written text about evidence gathered through observation and measurement. Causal conjunctions within a word bank along with concept mapping and using causal links between concepts scaffolds a causal explanation text more efficiently. Together, modeling and using specific science discourse tools to determine model fit for sense-making provides ELLs with equitable and quality learning opportunities.

4.5 Oral/Written Text Checklists & Rubrics for Assessment

During these experiences, it is important that students are monitored in their use of these discourse tools. A checklist should include very specific language choices ELLs make when presenting claims, evidence and reasoning. Figure 2 presents a

Presents a claim
• Use of present tense • Use of relating verb to classify or present cause-effect relationships • Use of third person reference • Claim is scientifically accurate
Presents Evidence
• Use of action verbal groups to express events • Use of general, abstract, technical, non-human nouns • Use of extended noun groups • Adverbials and dependent clauses to express details (e.g., place, extent, manner
Presents Reasoning
• Use of relating verbs to present reasons and explain causes and consequences • Use of action verbs to provide examples of causes and consequences • Use of evaluative vocabulary • Acknowledges and/or refutes alternative positions with interpersonal resources: concession (but…although, etc.), modality (e.g., modal verbs, modal adjectives, modal adverbials), attribution (scientists report that…) • Uses interpersonal metaphor (*it is clear that ...)* to express opinion in implicit ways

Fig. 2 Sample language-focused checklist

possible checklist that can be used to provide students with feedback on content-specific language use.

Similarly, rubrics should be designed to monitor the quality of the use of register elements as in Fig. 3. To provide additional focus on language expectations, teachers could provide model texts and identify the parts of the text that accomplishes each textual quality in the checklist or rubric. In our experience in working with ELLs, these types of discussions support students' understanding of the language expectations required to realize science explanations and arguments.

5 Conclusion

Model-based instruction through a purposeful language perspective in science discourse provides quality and equitable opportunities for ELL science learning. The approach allows ELLs to engage in inquiry processes such as modeling and arguing through model evaluation. Without the experience of instruction designed around observation, experimentation and reasoning, ELLs are confronted with content-linguistic challenges that result in missing opportunities to engage in the social practices of science communities. A purposeful language perspective takes the contextual variables of the science classroom into account for instruction, providing language scaffolding by equipping ELLs with linguistic resources to use language

	Novice 1	Apprentice 2	Proficient 3	Advanced 4
Expressing Ideas (Field)	• Verb and noun groups are not linked to intended function; • Circumstances are not presented	• Some verb and noun groups are insufficiently linked to intended function, OR • Limited variation of verb and noun groups; • Circumstances do not contextualize the topic in most of the text	• Verb and noun groups are linked to intended function • Some variation of verb and noun groups; • Circumstances contextualize the topic in some of the text	• Verb and noun groups are linked to intended function • Extensive variation of verb and noun groups; • Circumstances contextualize the topic throughout the text
Point of View (Tenor)	• Text does not present specific views; • Word choice lacks variation	• Uses one strategy to present specific views; the strategies (strength of strategy: too strong or too weak) used mostly do not fit the genre or audience; • Word choice variation is limited	• Uses one or two strategies to present specific views; the strategies (strength of strategy: too strong or too weak) used may not fit the genre or audience; • Word choice is somewhat varied	• Uses a range of strategies (e.g., modality, evaluative resources) to present specific views; • Extensive word choice variation
Clausal Links/Elaboration (Mode)	• Clauses are not connected; • No use of elaboration strategies • No sentence variety • No elaboration of ideas	• Clauses are loosely connected (listing of events, reasons or examples); • Strategies used result in low sentence variety; • Limited or no use of accurate elaboration strategies	• Clauses are somewhat connected; • Strategies used result in some sentence variety; • Use of elaboration strategies is mostly accurate	• Clauses connect ideas well; • References to cause and effect in theme position • Strategies used result in well-varied sentence structure; • Grammatically accurate use of elaboration strategies

Fig. 3 Sample explanation and reasoning rubric

in science. As a result, ELLs are provided with ample opportunities to engage in explanation and argumentation as meaningful language practice.

Reflection Questions

1. How can content and language objectives be purposefully selected to resemble a model-based instructional approach to teaching science to ELLs?
2. As a teacher, what scientific principles will you consider prior to planning a model-based lesson and what text structures will you need to linguistically scaffold?
3. What content and language strategies will you provide to your students for representing knowledge in models and engage in science text production?

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Scaffolding English Language Learners' Literacy Development Through a Science Inquiry Approach

Sandra Mercuri and Natascha Mercuri

Abstract This chapter presents an interdisciplinary *Life Sciences* inquiry unit centered in a constructivist view of learning through macro and micro scaffolding. Drawing on both disciplinary literacy and discipline-specific academic language lenses, we discuss how the interrelated activities are aligned with national standards and show how the language and literacy practices are embedded throughout the science unit. The chapter provides examples of how teachers could help English Language Learners (ELLs) learn content and to read and write more, to use grammar and vocabulary more accurately, and to master an extensive range of linguistic features in order to meet the challenges presented by the curriculum standards.

1 Introduction

Both recent immigrants, some of them refugees, and students who have been in the school system for more than 5 years often lack the academic language proficiency needed to succeed at the secondary level. García (2009) reports that many new immigrants enter middle schools where there are limited resources and few teachers who are prepared to provide the language and literacy instruction these students need. Moreover, Short and Fitzsimmons (2007) point out that ELLs face double the work of native English speakers by having to learn both English and academic content simultaneously. Teachers of science, math, and social studies often struggle to understand the needs of ELLs (Pawan & Craig, 2011), which translates into a one-size-fits- all type of instruction. Also, these students have different needs and are often placed inappropriately in classes that do not give them rigorous content and literacy support to achieve academically. To enable students to use "discourses, or

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ways of thinking and talking that characterize each of the academic domains" (García & Godina, 2004, p.306), teachers of different subject areas must teach the specific academic literacy of their subject. This not only includes learning the specific terms relevant to the subject, but understanding also how to read, write, talk and think in particular ways for each content area.

In order to address the myriad of needs of ELLs in the middle grades and beyond, effective teachers should provide instruction that builds students' academic language proficiency and literacy skills to help them access disciplinary knowledge. Researchers and teacher educators have described academic language and literacy (Gibbons 2015; Freeman & Freeman, 2009; Shanahan & Shanahan, 2008) and provided suggestions that teachers can use to help students access content knowledge and develop discipline –specific discourse patterns. According to Scarcella (2008), academic language is more cognitively demanding and makes more use of reading and writing than conversational language. The grammatical and lexical competences used are essential in academic language, even more so than conversational language. Language functions used to persuade, summarize, or argue play a more critical role in academic language than the narratives more commonly used in everyday language. Academic language involves higher-order thinking skills which enable students to evaluate, analyze, and synthesize ideas from different sources. In addition to these cognitive and linguistic skills, academic language also includes metacognitive awareness, which is the ability to think about language and the use of background knowledge to enhance comprehension of texts (Gibbons, 2015). de Oliveira (2017) has presented a language based approach to content instruction (LACI) which addresses the high demands of state standards and equips educators with the tools to "focus on the meanings that are made (the "content") and the language through which the meanings are expressed (pp.44)".

In this chapter, we share an approach for integrating language arts curriculum with science through the example of a 7th grade science inquiry unit. The context is a Title I school located in an urban area in a southern part of the United States. The school serves 653 students between 6th through 8th grade, out of which 589 are economically disadvantaged, 479 are labeled English Language Learners, and 608 are at risk. The school has 98% Latino population. The demographic of the classroom in which the pedagogical practice was applied and observed includes 28 students, out of which 22 are labeled English Language Learners. All students in this class are Latinos with different degrees of bilingualism. The teacher, who we refer to in this chapter as Ms. Aimee, developed an interdisciplinary unit of inquiry connecting the language arts common core standards (CCSS, 2010) and Next Generation Science Standards (NGSS, 2013). The unit shows how the opportunities for content and academic language development presented by the standards can be actualized by the ELLs in her class.

In her planning sessions, Ms. Aimee articulated the integration of science and language arts as she developed the activities, selected materials and organized the labs for each session. She applied the expectations of the CCSS and strategically embedded reading, writing, listening, and speaking in her science curriculum. In addition, she delivered the lessons with a clear focus on both content learning and

academic language development. Her interdisciplinary planning focused around macro concepts and micro-planning structures to support the development of academic language and access to content knowledge. The *macro-planning scaffold* is defined as the integration of language and content within and through the lessons of the interdisciplinary unit, and the *micro-planning scaffold* includes the integration of learning strategies to make academic content comprehensible at the time of teaching (Bunch, Kibler, & Pimentel, 2012; Schleppegrell & O'Hallaron, 2011). In this chapter, we use the term macro and micro scaffolding, which Bunch et al. (2012) use to refer to the integration of literacy and content within and across lessons.

In the following sections, we describe the teaching approach that Ms. Aimee used to integrate content and language in the interdisciplinary unit of inquiry on animal and plant cells. The integration aimed to address the linguistic needs of her ELLs students.

2 Approach to Teaching Science to ELLs: Interdisciplinary Units of Inquiry

In order to address the linguistic demands of the content area of science and to further develop the literacy skills of her ELLs, Ms. Aimee used an inquiry-based learning approach organized around an interdisciplinary unit with literacy embedded to teach her 7th grade science class. Planning interdisciplinary units of inquiry allows for the design and implementation of teaching practices that stimulate students' thinking by presenting the content in an integrated way rather than as separate subjects. An important aspect of the macro-level planning used in this approach is the identification of an essential question that represents the thread of the unit across the two content areas. Freeman, Freeman and Mercuri (2018) and Wood (2015) explain that as students interact with the selected texts and actively participate in the activities planned by the teacher, they can formulate answers to the essential question from different points of view, and thus arrive at generalizations on the topic of study, which requires a high cognitive process. Ms. Aimee's integrated approach across the content areas of science and language arts aimed to help students better understand the content concepts as well as the connecting thread of the ideas presented as they tried to answer the unit's essential question. The goal was for ELLs to have opportunities to develop their language skills, incorporate scientific vocabulary into their linguistic repertories, and access disciplinary knowledge. In addition, they were expected to access different types of texts and engage in scientific explanations with teacher support. In order to materialize the integration of these two subjects, Ms. Aimee followed the concept of macro and micro-scaffolding (Bunch et al., 2012) and developed her unit about cells following the steps below:

- Analyze the scope and sequence provided by the district or state.
- Select the standards to be taught in the unit.

- Decide on a title that reflects the integrated nature of the unit.
- Develop an essential question as the connecting thread of the unit.
- Select the materials to be used for the unit (This includes different types of texts and media).
- Develop content and language targets for the unit using the following guiding questions:
- List all the projects students will do in this unit.
- Develop mini/units or clusters of ideas that are part of the integrated whole of the unit of study.

Table 1 below illustrates the steps followed by Ms. Aimee during creation of her unit.

As shown in the table, during her planning time Aimee organized the topics and activities in mini units that clearly address the content and language targets she planned for the overall unit. She developed six interrelated mini units. Table 2 presents an example of the organization of mini unit 1 with lists of the materials, activities and concepts she will address.

Identifying the linguistic demands of the interdisciplinary unit of inquiry at the macro-structure or unit level is essential for teachers of ELLs. Based on the needs

Table 1 Macro scaffold of Cell unit

Unit Title: Plants and animal cells					
Guiding or essential question:					
How do cells support the survival of the species depending on the environment?					
CCSS			***NGSS***		
Materials					
Science textbook					
Trade books from *National Geographic*					
Graphic organizers					
Posters and visuals					
Lab materials and models					
Interactive and board games					
Content target – *What are the key concepts that students need to learn in this unit?*					
Language target – *What is the language expectations for this unit? What are the most important functions of language that students will use in this unit?* (Adapted from Gottlieb y Ernst-Slavit, 2014)					
Projects and assessment planned for the unit					
Lab reports					
Weekly quizzes					
Presentations of models or readings					
End of unit test					
Interrelated mini units					
Parts of cells and organelles	Functions of cells and organelles	Introduction to DNA and genetics	Genetics	Sexual and asexual reproduction	Unit review

Table 2 Mini unit 1

Mini unit 1				
Weekly topic (90 min. per day)	Science concepts	Linguistic focus	Strategies and resources	Assessment
Cells parts and organelles	Identification and main traits of animal and plant cells and organelles	Vocabulary related to cells	Hands on activities	Lab report
		Lab reports	Graphic organizers	Weekly quiz
		Compare-contrast characteristics of cells	Lab work with microscopes	Model presentations
		Analogies	Cells edible models	Informal academic discussions
		Descriptive writing	Informational videos	
		Compare and contrast paragraphs	Power point presentations	
			Quiz-quiz trade	
			Different texts	

of their students, teachers design activities that involve them in multiple literacy development events that, at the same time, provide access to academic content. Also, it is important to include learning strategies that strategically integrate the four language domains: reading, writing, listening and speaking while providing different scaffolds to facilitate content learning and acquisition of necessary skills (Mercuri & Ebe, 2011). These four language domains define how ELLs process and use language:

- Listening – process, understand, interpret, and evaluate spoken language in a variety of situations.
- Speaking – engage in oral communication in a variety of situations for a variety of purposes and audiences.
- Reading – process, understand, interpret, and evaluate written language, symbols and text with understanding and fluency.
- Writing – engage in written communication in a variety of situations for a variety of purposes and audiences. (WIDA, 2007)

Once Ms. Aimee decided on the standards she was planning to materialize through instruction, she designed a series of comprehensive assessment projects to measure students' learning of the unit concepts. Gottlieb (2006) explains that a set of interconnected activities forms a project, and emphasizes that project evaluation is closely linked to teaching. In addition, projects give students the opportunity to use language while demonstrating their knowledge (Hurley & Tinajero, 2001). An interdisciplinary unit should include a culminating project or a series of connected smaller projects that allows integrating and evaluating the goals of the unit.

Once the macro scaffold of the cell unit was finalized, Ms. Aimee moved to develop the micro structures or micro scaffolds of the different mini units. The micro-scaffold focuses on teaching concrete ideas about the content of the unit with an emphasis on the literacy skills that need to be traversed to facilitate access to content. At this planning level, Ms. Aimee considered the content requirements of the discipline and strategically integrated different strategies in each lesson. This prepared her to model different types of texts and to facilitate the acquisition and use of vocabulary relevant to the discipline. Each lesson aimed to provide students with the skills necessary to effectively participate in academic conversations and writing assignments on the subject in both small-group and whole-group presentations.

The micro scaffolding allows for language arts concepts to be reinforced and eventually acquired as they are presented through multiple opportunities for scientific reading, writing and academic discussions. The essential practices of the micro scaffolding are anchored in the content and language standards selected for each lesson and include the development of academic literacy through activities that promote the four dimensions of language. The lesson is organized vertically by the focused question. Similar to the process of developing the essential question of the unit, each lesson requires the development of a narrower focused question that centers instruction on one of the interrelated concepts of the interdisciplinary unit. Similarly, while a language and a content target frame the macro scaffold, language and content objectives frame the lesson or series of lessons. Content objectives indicate the knowledge and skills (facts, ideas, processes) that students must develop in each content area. In addition, language objectives are related to the content that is intended to teach and define the forms and linguistic functions that a student must demonstrate in writing and when talking about different subjects (Freeman, Freeman, Soto, & Ebe, 2016).

When planning a unit (macro scaffold) the number of standards that are integrated are varied. On the contrary, at the level of the micro scaffold (a lesson or series of lessons) the standards are few and observable through the content and language objectives designed for each lesson. While in the science classroom, teachers tailor the lesson's activities, keeping in mind the many strategies that would enhance the scientific concepts. Ms. Aimee, for example, considered the linguistic demands presented in a lesson using the steps below:

- From the set of science standards chosen for the interdisciplinary unit, she selected a few to anchor the lesson.
- She also selected language standards that encompass the four language skills (reading, writing, listening and speaking) linked to the science standards.
- She formulated content and language goals, such as those shown in Table 3.
- She designed activities and/or projects in relation to content and language objectives and defined the essential practices integrated into the lesson.
- She aligned assessment tools with teaching.

Table 3 Language and content objectives – Micro scaffold level

Content objectives	*Determine what students should know (theoretical knowledge) and what they should be able to do to demonstrate their understanding of content (procedural knowledge).*
Language objectives	*Defines the language students need to use to demonstrate understanding of content.*

Through this integrated approach to teaching science and language arts, the teacher facilitates the development of disciplinary literacy by using multiple types of texts and engaging the students with diverse oral and written tasks around the topic of cells.

3 Theoretical Foundations of the Approach

This inquiry based learning approach is centered on a constructivist view of learning. According to Walqui (2007) and Gibbons (2009), the key to teaching English learners is the constructivist view of scaffolding students' language acquisition in combination with content learning. Tobin (2000, 2009) defines constructivism as a way of thinking about how students can learn best depending on the situational context of the learning event, how others can mediate learning for students, and how the activities or tasks provided by the teacher help students acquire the necessary knowledge shaped by their own experiences.

Teachers who hold a constructivist view of teaching and learning take into consideration what students know and can do, how students negotiate meaning as they interact with others and with artifacts, and how students demonstrate their conceptual knowledge of the subject and receive effective and timely feedback (Erikson, 2007; Mercuri, 2015). Thus, making connections, both personal and academic, to students' background knowledge is key to facilitate students' acquisition of both language and content (Egbert & Ernst-Slavit, 2010).

In order to create a constructivist learning environment with scaffolding instruction, teachers organize the curriculum around interdisciplinary units of inquiry to help their students construct knowledge and develop academic language simultaneously (Díaz-Rico, 2013; Mercuri & Ebe, 2011). As described in the previous section, this type of integrated curriculum follows Bunch et al.'s (2012) concept of macro scaffolding, the integration of language and content within and across lessons and units, and micro scaffolding, the integration of strategies to make the input comprehensible in everyday teaching based on tasks that require the use of all four language domains. The unit activities are based on the students' cognitive and linguistic development and focus on the learner as a constructor of knowledge while the teacher is a mediator who guides and challenges the student through the learning process and appropriate literacy practices.

Additionally, we draw on Shannahan and Shannahan's model of literacy (2008). This model aims to address the needs of today's schooling and to better prepare

students for the demands of high-literacy jobs. Their literacy progression model is represented by a three-tier pyramid. The bottom of the pyramid represents the *Basic Skills,* which includes but is not limited to decoding, comprehending print and literacy conventions, having fluency routines, recognizing high frequency words and recognizing common text structures such as story formats and lists structures. Moving upward we find the *Intermediate Skills*, which include students being able to decode multisyllabic words and respond to terms that are not high frequency, having an extended vocabulary, and understanding more complex punctuation. In addition, they are able to understand more complex type of texts such as cause and effect, problem solution, parallel plots, etc. Finally, at the top of the pyramid is *Disciplinary Literacy*. At this level, students have the ability to read more abstract discipline-specific texts, understand technical vocabulary that is content specific and write to demonstrate content area knowledge. Developing disciplinary literacy also requires that students can understand and effectively use the specific forms of oral and written communication that vary from subject to subject. In addition, it comprises the knowledge of multiple *genres* of text, as well as purposes for text use. For instance, in science, students need to become familiar with how to write experiments' instructions and how to develop arguments based on evidence. For ELLs, this level of literacy has to be gradually integrated and supported with strategies in order for students to be able to accomplish the content -literacy integrated tasks planned by their teachers within the unit of study, but with subject-matter specificity (Shanahan & Shanahan, 2008, pp. 54).

Finally, we use Fang and Schlepregrell's conceptualization of academic language and literacy (2010). Its discipline-specific nature needs to be actualized through tasks that address all *language domains*: reading, writing, listening and speaking, and visual literacy skills (CCSS, 2010; NGSS, 2013). According to Fang and Schlepregrell (2008), knowledge is constructed in and through language and language changes with changes in knowledge. As students move from elementary to secondary schools, they encounter specialized knowledge and engage in new contexts of learning in all subjects. The language that constructs more specialized knowledge tends to be more abstract, technical, and hierarchically organized than the more familiar and contextualized language that students typically encounter in elementary grades. The authors emphasize that students at the secondary level need to develop specialized literacies (literacy relevant to each content area) as well as a critical literacy they can use across subject areas to engage with, reflect on, and assess specialized and advanced knowledge, a position that aligns with Shanahan and Shanahan's (2008) model of literacy progressions. Moreover, Fang and Schlepregrell (2010) encourage teachers to engage students in "talking about the meaning in the choices authors make as they write clauses, sentences, and texts" (pp.588). They also explain that it is important for teachers to help students "identify language patterns and associated meanings specific to particular disciplines as they focus on how language works, helping them comprehend and critique the texts of secondary content areas (p. 588)". Framed by these theories, the following section presents and analyzes some of the activities Ms. Aimee planned for her ELLs through macro and micro scaffolds of the unit of study about cells.

4 Implementation of the Approach

In this section, we share an example of an interdisciplinary *Life Sciences* unit about plant and animal cells, the reproductive system and the concept of heredity using the Common Core standards for language arts (CCSS, 2010) and the Next Generation Science Standards (NGCS, 2013). The aim of the unit was to guide students in understanding how a system is made of parts, and that those parts are made of smaller parts that accomplish specific functions that cannot be seen with our naked eyes. Parallel to this, students were also introduced to types of reproduction and the transfer of traits through generations that survive, depending on our environment. The academic demands of this unit required students to read and write, to use grammar and vocabulary accurately, and to master an extensive range of linguistic features.

During the first 2 weeks of instruction, students were exposed to informational texts. Gradually, Ms. Aimee began incorporating compare and contrast and descriptive texts. These types of texts were introduced in various forms that ranged from informational videos, power point presentations, and lab reports to scientific reports. The following section provides two examples from Ms. Aimee's micro scaffolding lessons where the language and literacy components have been embedded to facilitate access to content as well as to provide opportunities for demonstrating understanding of new knowledge about the subject.

4.1 Micro Scaffold 1

With the guidance of the teacher, students engaged in lab work that required the observation of the main characteristics of animal and plant cells. During the lab, students used microscopes, iodine solution and a sample of a plant layer as well as cells extracted from their own cheeks with the help of a toothpick. By working with partners, students were asked to observe what they saw, discuss it, take notes and illustrate their findings. After the observations, students were asked to write a lab report that consisted of reporting their observations and findings using a template provided by the teacher. This template asked for purpose, materials, procedures (Including signal words such as first, second, then, last), results, and final observations.

The structure provided by Ms. Aimee allowed her ELLs to understand the structure of the task at hand and provided key connectors to organize their thinking processes as they did the observations and prepared to present the finding of the lab to the class. The text below is a sample of one of the groups' observation notes:

> We saw rows of rectangular cell blocks lined with membranes. The cell membrane was opaque. The cells were rectangular. The cells had a round shape. Not all cells were equally as large. Small, thin lines surrand (sic) the cells. The thin lines in the cells are the walls of the onion cell.

Analysis The preceding text shows several examples of this 7th grade group's evolving academic literacy. For example, at the discourse level, this writing sample shows that the students are able to write an informational text to communicate ideas based on the observations done at the lab. In addition, there is use of technical vocabulary such as *cell membrane* as well as general academic vocabulary choices like *rectangular cell blocks*. Moreover, the selection of not so commonly used adjectives like *opaque,* demonstrates the increasing ability to read and understand abstract discipline-specific texts, and use technical vocabulary that is content specific. Similarly, at the sentence level, students are able to write more complex sentences like *Not all cell were as equally as large*. The use of the adverb construction *"equally as large"* make this sentence more complex. However, other sentences still present second language writing characteristics such as misspelled words and the use of the possessive written with the discourse pattern of their dominant language, Spanish. For example:

Small, thin lines *surrand* all the cells. The thin lines in the cell are the *cell walls of the onion cell*.

Instead of:

Small, thin lines *surrand* all the cells. The thin lines in the cell are the *onion cell walls*.

Additionally, in terms of sentence construction, there is evident repetition of the word cell, which makes the sentences basic and simplistic.

The analysis of these types of ELL's writing challenges guided Ms. Aimee's grammar mini lessons, which aimed to support students' writing development of more academic texts.

For practitioners who wish to use similar practices, here are a few steps that can be used:

1. Use an authentic piece of student writing in order to validate the student's work and provide a more realistic sample rather than basing it on random grammar or vocabulary practice.
2. Conduct a read aloud in order to give students time to think about their own writing and using the read aloud as a mentor text.
3. Allow students time to discuss in partners and think of ways in which the informational text could be written.
4. Conduct a class discussion so students have an opportunity to share their ideas with the whole class.
5. Guide students into writing compound sentences instead of simple sentences that have unnecessary repetition. For instance, instead of using two simple sentences such as, "The cells were rectangular. The cells had a round shape," students could write a compound sentence such as "Some cells were rectangular and others had a round shape." In this particular case, it is important to highlight the use of the coordinating conjunction "and." This practice can also be extended by

finding similar examples from other students or by having students think of other sentences that can be written in the same way.

6. Similarly, guide students to find other simple sentences that can be fused into compound ones. For instance, point to the first two sentences in this text, and have students think of ways in which they can be joined without repeating. For instance, instead of writing "we saw rows of rectangular cell blocks lined with membranes. The cell membrane was opaque," it can be written as "we saw rows of rectangular cell blocks lined with membranes which were opaque."

Following the completion of the lab report, the teacher guided a whole class discussion in order to make students aware of their findings and reinforce their findings. The teacher guided the discussion with the following questions:

- How does the shape of the onion cell differ from that of the cheek cells?
- Which cells seem to be arranged in a more regular pattern?
- What structures were you able to see in both types of cells?

Ms. Aimee, set clear expectations for the academic discussion. Students had access to sentence frames to engage in scientific conversations as needed. They were expected to respond to one another with respect and to present information in grade appropriate manner. Some of the sentence frames provided were:

Based on the observation we did, I_____.

I agree with _____ in that_____. However, _____.

We disagree with _____' observations. On the contrary, we observed that_____.

After the class discussion, students were exposed to informative videos and Power Point presentations discussing the characteristics and differences between animal and plant cells. With all the information gathered through the PowerPoint presentation, lab work and informative videos, students were asked to create anchor charts with the main characteristics and layout of the plant and animal cells. Through this activity, students revisited the concepts learned and organized the information in a way that became meaningful to them. The posters created and presented by the students showed technical vocabulary such as *vacuole, cell membrane, mitochondria, nucleus and cytoplasm*.

This activity addressed the four language domains. Students were exposed to informational videos, through which they listened to information related to their content specific topic, they discussed their findings and shared their findings in a whole class discussion, they read each other reports and the information presented through presentations, and wrote informational texts based on the information gathered and their own observations. Ms. Aimee's linguistics expectations for her students were discussed before every task. They needed to present their work using the academic vocabulary of the discipline and expressing scientific ideas through well-constructed arguments or explanations based on evidence collected through

labs and information gathered through readings, videos and other media. The following micro scaffold is an example of a different writing assignment planned by Ms. Aimee.

4.2 Micro Scaffold 2

With the guidance of the teacher, the students completed a whole-class Venn diagram of the similarities and differences between both types of cells. Then, the teacher modeled how to write a compare-and-contrast essay using a familiar topic as an example. After the micro scaffolds were in place, students wrote a compare-contrast essay using the information on the Venn diagram co-constructed with the teacher. The teacher provided a text frame to model how to organize paragraphs to convey scientific information and further discuss the general layout of essay writing and the linguistic aspects of the task (such as types of sentences, connectors, and thesis statement). Below is an example of the paragraph frame provided.

Cells are the _____, _____ and _____unit of _____ that can be replicated independently. However, not all cells are _____and this variation can be seen also_____. This distinction between cells is clearly seen when comparing_____.
Plants and animal cells are both_____. This means that both types of cells have_____ which contains_____.
Plants and animal cells also contains_____. They also have _____which controls_____.
They also have _____, _____, _____, _____, _____ and_____ which are essential for both cells.
Plants and animal cells are different in many ways. First, _____.
Second, _____. Third, _____.
Lastly, _____. To conclude, we have learned that_____.

Analysis In this paragraph frame, the teacher provided students with a more complex text layout with different types of sentences:

Simple sentence – *Plats and animal cells are different in many ways____.*
Compound sentence – *However, not all cells are _____and this variation can be seen also_____.*
Complex sentence – *This means that both types of cells have_____.*

Similarly, the teacher modeled how to use connecting words such as *however, first*, *second, third, lastly* and *to conclude*. This type of scaffold helped students move from writing disjointed sentences to a more coherent and cohesive text. In addition, this scaffold constituted a guide for ELLs on how to develop and acquire discipline specific and more grade-appropriate text organization skills. Gradually, ELLs in Ms. Aimee's class were able to write more complex texts without this much support. Through similar type of scaffolds, students were exposed to different types of sentence structures. Additionally, with consistent modeling and opportunities for oral and written practice using similar micro scaffolds, students were able to use them when working independently.

5 Conclusion

When working with ELLs, science teachers face a dual challenge of teaching language and literacy as well as science. Many teachers argue that the designated instructional time for science is limited and they do not see a way to integrate language and literacy practices with science because these two subjects seem to be unrelated. However, when teachers like Ms. Aimee attempt to integrate both subjects in a strategic and thoughtful way based on the content of the grade level and the linguistic needs of their students, they are able to facilitate higher levels of literacy development and acquisition and use of academic vocabulary, empowering students to succeed in school and beyond. The conceptual and linguistic demands of this unit were fulfilled as the students engaged in a series of scaffolding activities that helped them build new content-related concepts at the same time as they grew more aware of the linguistic forms and structures needed to do so. Teachers, who serve ELLs in different educational contexts than Ms. Aimee, can apply some of the same practices described in this chapter in order to encourage students to not only learn and apply content-specific terms, but also develop linguistic awareness.

Reflection Questions

1. Taking into consideration the complexity of integration at the middle school level, discuss examples of literacy integration you could do within your content area to provide students with opportunities to access the curriculum, address the standards and develop higher academic literacy overall.
2. At your school, what are challenges you may encounter in order to provide students with opportunities to access an integrated curriculum with a clear focus on the development of the language of your discipline? What could be some possible solutions to those challenges?

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Using Communication Models to Teach ELLs Science

Alandeom W. Oliveira and Molly H. Weinburgh

Abstract Described in this chapter is how science teachers can use communication models to guide their design and implementation of science lessons for ELLs. Taking the form of diagrams that visually depict communicative processes underlying science content instruction, communication models provide instructors with an intuitive and accessible way of critically examining content-language integrated learning. More specifically, we show how two models – repair-and-accommodation and 5R – help science teachers with limited linguistic expertise infuse content learning with additional language acquisition.

1 Introduction

> In the beginning is the word. Everything is constructed in language; our experiences of lived time, lived space and lived body and lived human relation are all epistemologically and ontologically worded/lined/known/revealed/disclosed/understood/lived in words. (Leggo, 1998, p.175).

As highlighted in the above quotation by the poet Carl Leggo, the human experience is fundamentally a lexical one. Given this centrality of words to our lived experiences, it should come as no surprise that effectively teaching science to English Language Leaners (ELLs) requires a certain level of linguistic expertise (i.e., awareness and understanding of verbal communication). To meet the linguistic and epistemic needs of ELLs, science teachers should develop a basic understanding of the highly dynamic linguistic processes that underlie classroom communication, the

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complex relationship between language and ideas, and the elusive nature of content-based second language acquisition. In this chapter, we describe how this can be accomplished through the use of *communication models*. Because models can help viewers imagine interactions within formal systems that cannot actually be seen directly (Leach, Yates, & Scalon, 2008), they can help make content-language integration more apparent to science teachers.

There is growing interest among science educators in language-related issues, including argumentation, questioning, writing, reading, and cooperative discussion. In particular, the Next Generation Science Standards (NGSS Lead States, 2013) stress the need for students to ask questions, construct explanations and engage in argumentation as they develop the canonical ideas of science. Nonetheless, pedagogical strategies to effectively meet the linguistic demands of science teaching are generally absent from professional teacher preparation and, therefore, the science classroom. As a result, many science teachers encounter difficulty when faced with the need to support ELLs and adopt language-focused pedagogy. To overcome this difficulty, teachers need to develop explicit knowledge and awareness of the underlying systems of language that enables effective content instruction. This is precisely what the use of communication models can help science teachers accomplish. By supporting instructors' linguistic expertise, communication models can help them more effectively attend to the communicative and epistemic needs of ELLs.

2 Approach to Teaching

A communication model is a visual representation that depicts communicative aspects of classroom instruction as diagrams (i.e., a pedagogical schematic of meaning-making in the classroom). Developed based on recent research and teachers' practical experiences, a communication model maps out the main communicative processes that underlie ELL science instruction (e.g., participants, interactions, message flow). Pedagogical practice is explicitly and concisely conceived as visual maps, hence providing practitioners with an intuitive and accessible way of sharing, critically examining and situating teaching practices in light of recent scholarly work.

The use of models for guiding teachers' design and implementation of science lessons for ELLs is not novel. Teaching methods books currently available to science educators provide classroom practitioners with longstanding pedagogical models of content-based instruction such as SIOP (Sheltered Instruction Observation Protocol) (Echevarria, Vogt, & Short, 2003). However, these models have been characterized by a strong degree of linearity, often conceiving of content-based language instruction simply as a linear sequence of instructional steps. A good example is the SIOP's eight phases: Lesson Preparation, Building Background, Comprehensible Input, Strategies, Interaction, Practice & Application, and Lesson Delivery Review/Assessment. Despite its many benefits such as an intuitive and simple format and strong emphasis on the need for teachers to go beyond content

(e.g., developing clear language objectives, explicit listing of key vocabulary upfront), such a series of instructional steps does not capture the dynamic and fluid nature of pedagogical action aimed at meeting the needs of ELLs. Further, its checklist-like structure encourages mechanic use by teachers (blindly following the series of instructional steps), limiting its effectiveness as a tool to foster teacher reflection or as means to highlight the importance of instructional context when teaching science to ELLs. While we recognize that these linear models have their place in guiding content instruction to ELLs, we believe that science teachers should go beyond and also use more sophisticated, non-linear models of ELL instruction for lesson planning and reflection.

Widespread popularity and adoption of the SIOP model has led many teachers to view it as "the right way" of teaching science to ELLs, that is, the single method for effectively teaching ELLs science. Subsequent to their SIOP training, these teachers tend to make a concerted effort to bring their practices into line with this particular model and teach science the right way. Compliance with the SIOP model is simply assumed as a guarantee of teaching effectiveness with little consideration given to local adaptation and strategic flexibility. Such a focus on following the right model of ELL science instruction is unproductive as the methods for effectively helping ELLs develop literacy skills in science are varied and diverse. In this chapter, we focus on two models of classroom communication rather than instructional sequences. With these models, science teachers strive to contextually make communication in their classrooms more accessible and conducive to acquisition of content based on careful consideration of their students' unique needs and situational factors.

2.1 Repair-and-Accommodation Model

This model deals mainly with classroom discussions, particularly situations involving *oral repair* and *accommodation* (Fig. 1). The former refers to moments during a discussion when a student says something problematic (e.g., mispronunciation or misuse a word) and there is a need for repair (correction of the oral error). In contrast, accommodation refers to moments in a discussion when the teacher needs to adjust her way of talking (e.g., speak slower, use simpler language) to help students comprehend what is being said, and hence accommodate their linguistic needs. Developed to help instructors deal with oral difficulties commonly encountered by ELL students when participating in classroom discussions, this model has been used with success by science teachers in New York as a guiding framework for planning and implementing oral aspects of ELL science instruction.

When using the above model, teachers consider in advance how they might react to a student who unexpectedly misspeaks. One option is to correct the student directly (e.g., "*It is pronounced…*" or "*In English/Science, we say…*"). However, this comes with the risk of public humiliation and embarrassment since it draws attention to one's lack of linguistic competence. Alternatively, teachers can

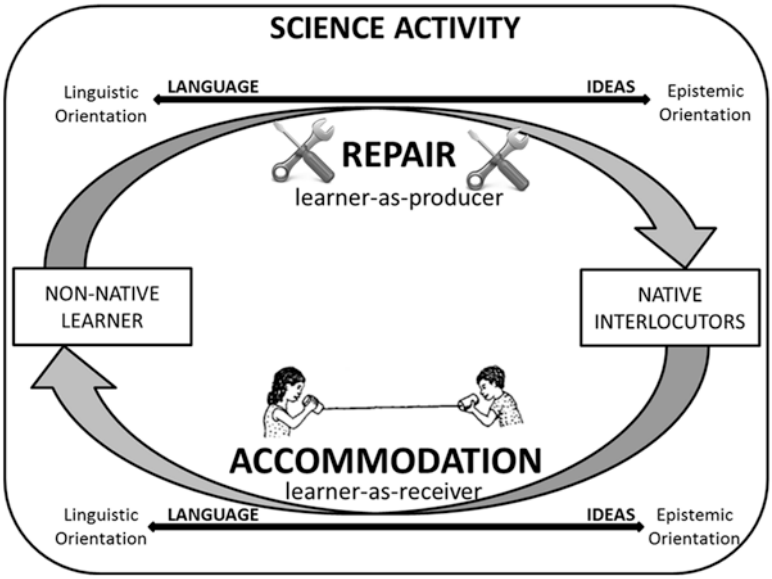

Fig. 1 Repair-and-accommodation model

encourage students to recognize their mistake and correct themselves by posing follow-up questions such as clarification requests (e.g., "*What did you mean?*" and "*Huh?*"). The model also prompts teachers to reflect about their use of specialized jargon since doing so comes with the risk of rendering the discussion incomprehensible to students. One option is to accommodate students by speaking in simple, lay terms. However, excessive simplification can be seen as condescending and inadvertently prevent access to the language of science (students need to hear scientific language in order to learn it). Rather than making such pedagogical decisions *impromptu*, teachers are encouraged to reflect about their options *a priori*.

2.2 5R Model

This model provides another way for teachers to engage in thinking about the language/content connection in terms of non-linear use of language and conceptual understanding. It presents ELL science instruction in terms of five communicative moves: Replace, Reposition, Reload, Repeat, and Reveal (Fig. 2). Each 'R' encourages teachers to plan for strategic ways of responding to ELL students' needs and thoughtfully introduce vocabulary. Rather than presenting a list of scientific terms at the beginning (a fixed instructional step in models like SIOP), the teacher introduces and reinforces vocabulary throughout the lesson through strategic deployment of R moves. This model has been successfully used by teachers in Texas as a

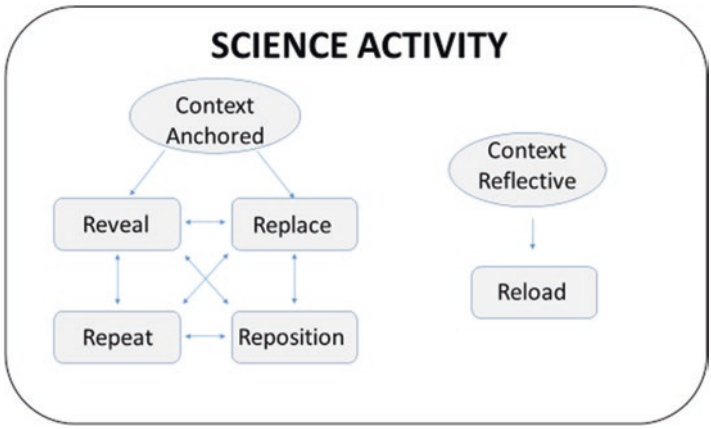

Fig. 2 5R communication model

heuristic to help them more flexibly think about how and when to include language strategies during science lessons.

When utilizing this model, teachers carefully consider in advance when and how to use the R-moves within the context of a lesson to help ELL students learn the language of science. A brief description of each R-move follows:

- *Replace* is a type of move wherein the teacher provides ELLs with the academic term that can be used in place of the everyday term first used by the student. The teacher honors the non-scientific language and builds upon it as a natural way to develop both language and content.
- *Reveal* is a move wherein the teacher provides ELLs with an academic term that does not exist in everyday language. Because science has many new and unique terms, teachers must introduce students to new vocabulary as it is needed to further meaning-making.
- *Repeat* is a move wherein the teacher provides ELLs with multiple opportunities to encounter and express meanings using multiple modes. The teacher builds into the lesson authentic reasons for the re-use of language as a tool for understanding.
- *Reload* is a move focused on revisiting and reexamining words from prior lessons. During reloading, teachers can help students move beyond a definition to seeing the relationship between the ideas presented in the words.
- *Reposition*, the most complex, is a move wherein teachers encourage ELLs to adopt the specific communication patterns of science such as use of passive voice (e.g., "*it was observed that*…") and nominalizations (e.g., "*the representation of a 2s orbital shows* …"). Teachers use their own speaking to model the way to communicate scientifically. They also help students edit their written work to mirror scientific discourse.

3 Theoretical Foundations of the Approach

Both of the communication models described above are based on current research and theoretical work.

3.1 Repair-and-Accommodation Model

The analytical concept of *repair* has been extensively used by conversation analysts interested in communicative "break-downs," moments in conversation in which information is not successfully exchanged between a producer and a receiver and a degree of miscommunication ensues (Jefferson, 1987; Schegloff, 2000). In this literature, repair typically refers to moments in face-to-face interaction focused on correcting (replacing, refining, or clarifying) a speaker's previous contribution to ongoing talk (e.g., an unclear utterance, an unfinished statement, or an inaccurate remark). As emphasized by Pomerantz and Fehr (2011), "interactants [in verbal exchanges] have ways of fixing, modifying or correcting what they and their co-participants are saying and doing as they interact" (p. 171). Likewise, science teachers' pedagogical approaches can provide ELLs with varied numbers of opportunities, format options, and degrees of accessibility to language repair.

Language scholars consider *accommodation* to be an essential aspect of oral communication (Street & Giles, 1982). Its main premise is that, to make communication possible and overcome potential interactional problems, teachers need to provide ELLs with a comprehensible input. This involves making use of simplified language with a reduced level of linguistic complexity due to modifications or adjustments such as slower speech, shorter sentences, simplified grammar, and non-specialized vocabulary that can be more easily understood when addressing learners with limited communicative competence (Ellis, 1991; Hatch, 1983; Krashen, 1985). By rendering the message being communicated more easily interpretable and accessible to learners with limited proficiency, teachers linguistically accommodate their students' communicative needs (Giles & Wiemann, 1987; Street & Giles, 1982). However, accommodation comes with the risk of excessive simplification, which can produce negative social impacts on verbal interactions (e.g., personal offense due to hearer perception of "being talked down to"), as well as negative linguistic effects such as denying learners accessibility to more complex linguistic forms in the target language. Oversimplification during science and mathematics can prevent students from being exposed and acquiring disciplinary registers (Glass & Oliveira, 2014; Hoadley, 2007).

From a communicative perspective, ELL teaching practice can also be categorized as having linguistic and epistemic *orientation* depending on the extent to which teachers and students focus their discursive interactions on language use (words being exchanged) or ideas (concepts being communicated). Science teaching

practices with a linguistic orientation focus mainly on the correct use of technical language and academic vocabulary and are designed for the specific purpose of providing ELLs with linguistic support (e.g., helping students familiarize themselves with unknown vocabulary words) (Oliveira et al., 2015). On the other hand, pedagogical practices with an epistemic orientation focus primarily on the promotion of conceptual comprehension and student mastery of content by ensuring successful production and reception of ideas "behind words" rather than the words themselves. These practices are designed specifically for the purpose of supporting ELLs by helping them mentally visualize abstract concepts and develop higher levels of conceptual thinking. Teaching approaches can have different degrees of linguistic and/or epistemic orientation, and hence be placed at varied locations along the language-idea continuum (see Fig. 1).

3.2 5R Model

This model (Weinburgh, & Silva, 2012; Weinburgh, Silva, Malloy, Marshall, & Smith, 2012) has its theoretical roots in the work of Gee (2002, 2008) and Lemke (2002, 2004). It stresses the overlap of language and conceptual understanding as well as the importance of socially-situated, contextually-emergent use of language. A central premise of the 5R model is that language emerges in the context of the science classroom as students experience hands-on science. This emerging language builds on what the ELL students already know and their L1 literacy and pushes them to use new scientific discourse. Further, this model conceives of teacher pedagogical action and language scaffolding in terms of discourse moves (Replace, Reveal, Repeat, Reposition, and Reload) performed by the science teacher flexibly and naturally (rather than linearly) as new language emerges during inquiry-oriented science activities. By doing so, the science instructor provides ELLs with *just-in-time support* (Bransford, Brown, & Cocking, 2002) in the form of well-placed interjections and vocabulary prompts while remaining unconstrained by a particular instructional sequence.

Underlying the 5R model is a theoretical stance of classroom discourse as a game. Like two players, teacher and student take turns making moves toward a particular goal or purpose. Their discursive moves reflect choices that can be strategically made in the course of the "language game". Because the rules that govern social interaction in the 5R model are relatively loose, teachers and students have more freedom to diverge from more traditional language games such as the initiation–response–evaluation (IRE) sequences (Lemke, 1990) wherein students attempt to "guess" the one right answer that the teacher is after. Because teacher-student interaction becomes less scripted with the 5R model, the classroom dialogue becomes more authentic, and hence conducive to language acquisition.

4 Implementation of the Approach

We now describe how teachers have implemented the communication models.

4.1 Repair-and-Accommodation Model

Subsequent to their introduction to this model, four experienced teachers (Mary, Carol, Peter and Alice) implemented it in their classrooms. Both Mary and Carol were faced with situations involving repair, whereas Peter and Alice sought to strategically accommodate their ELLs.

Repair Classroom episodes of language repair are shown in Table 1. In the first classroom, Mary (a physical science teacher) and Darren (an ELL student) interact as part of a whole-class discussion about forces and friction at the beginning of a lesson. In the second classroom, Carol (a life science teacher) and Tony (an ELL student) deliberate whether there are any wild wolves in the state of New York.

Table 1 Classroom episodes of language repair

Classroom 1	Classroom 2
Mary: Who here has ever ridden a bicycle on gravel? Yes, Darren.	Carol: How many of you would like to see a wolf?
Darren: Umm, on gravel the, umm, the like more lumpy it is, the more friction you have, because of the bombs on the surface of them [students laugh] umm, not exactly the ones that you throw, the bombs, they're tiny, umm, it goes with the tire bombs depending on, if you using a smooth like, umm, biking wheel, umm or like a mountain wheel, if you used a mountain wheel there will be more friction, and would go into each other, so they would like slow you down because there is lumps and then bombs appear like that and yeah and all sorts of things.	Tony: I've seen one.
Mary: Are you saying bombs like B-O-M-B-S?	Carol: You have? Where have you seen one?
Darren: Umm, not the ones that explode, no [he laughs]	Tony: It was at my dad's friend's house. They jumped over a gate.
Mary: That's [she laughs] I'm just clarifying the word you used, okay, who here has ever, in the winter, we talked about gravel, winter, ice, bicycle…	Carol: Maybe that was a coyote. I don't think there are any wolves in New York State as far as I understand. But there are coyotes.

In both classrooms, a teacher question prompts a "faulty" oral contribution from a student, more specifically a problematic word choice ("bombs" rather than "bumps," and "wolf" rather than "coyote"), which is then followed by a reparative sequence wherein teachers and students attempt to solve a perceived problem or trouble in discourse production. Mary attempts to prompt a *self-repair* by following up with a clarification request ("Are you saying bombs like B-O-M-B-S?"). By contrast, Carol resorts to *other-repair* by correcting the student's oral contribution herself ("Maybe that was a coyote. I don't think there are any wolves in New York State"). While Mary adopts a student-centered reparative strategy designed to save the ELL student's face, Carol favors a pedagogical approach to preventing miscommunication or misunderstanding that is more teacher-centered and potentially face-threatening to her ELL student.

Mary and Carol's practices also differ in terms of speakers' orientation toward language and ideas. In Classroom 1, we see an instance of *linguistic repair* (upper left-hand corner of Fig. 1). Mary focuses on a perceived mispronunciation of the word "bump" which is uttered by the ELL student as "bomb." Her main concern is clarifying the word itself rather than the conceptual idea behind this particular word choice. By contrast, a stronger epistemic orientation (upper right-hand corner of Fig. 1) is seen in Classroom 2 wherein Carol favors *epistemic repair*. Carol seeks to make the orally articulated scientific idea (Tony's claim to have seen a wolf in the state of New York) more precise, clear, and explicit. Her focus is on the concepts of wolf and coyote as she highlights to students the need for careful consideration of geographical location when scientifically naming similar species of wild canine organisms. What is repaired in this case is a faulty idea (a misconception) behind the student's word choice rather than faulty production of the word itself (e.g., mispronunciation).

Accommodation Peter and Alice's efforts to accommodate their ELLs are depicted in the two vignettes below:

VIGNETTE 1

In an urban high school, Peter, an experienced biology teacher notices that his ELL students struggle to answer extended-response questions in a standardized science state examination. ELL students in his class often have difficulty answering test items such as the following: "state which sequence of diagrams best illustrates ecological succession." Rather than performing the requested action of *stating*, many ELLs respond by *describing* a biological process or providing answers that are inconsistent with the specific type of written response being asked of them. Peter takes his ELLs' difficulty in answering extended response questions as a problem of misinterpretation of academic commands. To address this issue, Peter generates a list of the 15 *academic commands* (words or phrases that direct students to perform some sort of thinking or physical action) most frequently used in open-ended response questions based on a thorough review of state examinations from previous years. Peter then presents the list of academic commands to the class using an interactive white board (Smart Board) and asks students to work in groups to generate definitions in their own words for each academic command on the list.

Included in the list are academic words such as: *State*, *Identify*, *Describe*, *Support*, *Predict*, *Complete*, *Organize*, and *Explain*. Lastly, Peter provides students with sample questions from previous exams that contain the same terms from the list of academic commands. Aloud reading of each question is followed by a whole-class discussion in which Peter prompts students to articulate what exactly the question is asking them to do (the cognitive or physical action prompted by the assessor).

Peter's explicit instruction about the language of science tests constitutes an instance of *linguistic accommodation*. By increasing ELL's familiarity with the academic vocabulary of standardized science examinations, he seeks to promote student comprehension of the language used in state assessments. His efforts are strategically designed to make test items less complex and difficult for his students to understand (i.e., to turn extended response questions into a more comprehensible type of input). He accommodates his ELL's linguistic needs by providing explicit instruction on how to more accurately recognize the type of writing they need to perform in order to answer questions with particular academic words. No attention is actually given to scientific concepts or ideas. Instead the focus is on academic *speech acts* (Austin, 1962; Searle, 1969) – specific writing tasks that state assessors commonly ask test-takers to perform by wording extended response questions in particular ways.

VIGNETTE 2.

Alice, the teacher of an honor's chemistry class, notices that her transitional ELL students (native Chinese speakers who have tested out of ELL services) are struggling with the abstract, theoretical nature of chemistry concepts. The students find it challenging to apply the chemistry concepts learned in class to solving problems and answering questions that require higher level thinking skills. "In other sciences, students can dissect a heart when learning about it in biology, or they can witness the car gaining speed as it travels down the ramp in physics. However, in chemistry, I do not have the technology to show them the structure of an atom or the actual electrons being shared in a covalent bond. As a result, I am continuously trying to find new ways to visualize the concepts I am trying to have my students understand," Alice remarked in her reflective journal. To help her ELLs overcome their difficulties, Alice decides to increase her use of visuals – an effort aimed at better illustrating more abstract concepts. She incorporates *PhET Interactive Simulations* (University of Colorado, 2015) that allow students to explore abstract chemistry topics into several units of instruction. Students learn about isotopes, nuclear stability and average atomic mass by manipulating the number of protons and neutrons in the nucleus of isotopes of various elements. In another unit on concentration and molarity, students use a simulation to construct solutions of various molarities. And, in a unit on acids and bases, Alice hangs a very large pH scale across one wall of the classroom and instructs students to post properties of acids and bases as well as examples of acids and bases found at home at the appropriate point on the pH scale. Alice assigns each student a word problem involving calculation of pH from Ka or Kb and asks each to place their word problem at the appropriate spot on the pH scale. Most students take pictures on their cell phones and use this visual as a form of review.

Alice's visual pedagogy is a practice consistent with *epistemic accommodation*. Her primary focus is on promoting ELL student comprehension of scientific meanings (concepts or ideas) behind terms such as pH and molarity. By strategically co-deploying and switching modes of communication (verbal into visual and vice-versa), Alice makes the specialized meanings of her discipline more accessible and comprehensible to ELLs. Accommodation strategies with an epistemic orientation are aimed mainly at enhancing ELL student's conceptual knowledge rather than simply improving their English proficiency.

In sum, although the four teachers above were all introduced to the same communication model, their practices differed considerably during classroom implementation. Each science teacher implemented different parts of the repair-and-accommodation model as demanded by the unique context of their own classrooms. Rather than mechanically following a prescribed sequence of instructional steps, they implemented different parts of this model as they flexibly adapted to the situational conditions that existed in their classrooms and dynamically responded to their ELL students' specific needs.

4.2 5R Model

Subsequent to being introduced to the 5R model, two experienced teachers -- Wes (biology instructor) and Naomi (Earth science teacher) implemented it in their class. Wes taught in a school established exclusively for newcomers with little or no English, whereas Naomi's school was almost equally divided between L1 English and L1 Spanish. Classroom episodes of teacher deployment of R-moves are shown in Table 2. In the first classroom, students were asked to discuss the procedures for getting the blood sample into the well of the typing tray. When the students started using the lay term "dropper" with which they were familiar, the teacher strategically **replaced** it with the more specialized and precise word "pipette". And, in the second classroom, students used a stream table to model the effects of rain on a sandy hill as part of a lesson on erosion. While discussing with students, the teacher **replaced** the words "pile of sand" with the scientific term "alluvial fan" and **repeated** it. She used the word several times and even put it on the word wall to be used later in the lesson.

If you visited Naomi's class the next day, you would see her students engaged in a **reloading** activity. She had removed the words from the word wall and given each student a word. The students were to find a partner with a word that has some relationship to their word. The pair was to define each word and explain to the class what relationship they believe the words have. This activity helped stress the unique vocabulary learned in previous lessons while pointing out how words are connected to one another and to scientific ideas. For example, students might match alluvial fan with hole, giving the relationship as the sand from the hole became the alluvial fan. Other students might match alluvial fan with deposition, stating that the alluvial fan is a special form of deposition.

Table 2 Classroom implementation of replace and repeat

Classroom 1	Classroom 2 (Repeat)
S1: We need to move the blood sample to here (points to the well).	Naomi: What do you see happening?
S2: Use the dropper.	S1: The sand moved.
Wes: This type of dropper is called a pipette. How does it differ from most droppers?	S2: Made pile (points to the deposit)
S1: It has measurements on it.	Naomi: Look at the shape of the sand, does it have the shape of anything you have seen?
Wes: By using 'pipette' rather than 'dropper', others know that we are using a tool in science and that we want to be able to move a very specific amount of liquid.	S1: No
S2: So pick up the blood with the pipette and drop it here.	Naomi: Look again, does it look a little like a paper fan? [She shows the student a fan.]
	S1: Yes
	Naomi: This formation gets its name because it looks like a fan. It is called an alluvial fan.
	S2: What?
	Naomi: This is an alluvial fan (points). An alluvial fan is formed when water moves the sand. Let's write 'alluvial fan' on a word strip and put it on the word wall.

Examples of **reveal** and **reposition** are seen in two other science classrooms that have a large number of ELLs. **Reveal** is used very often in science because new equipment, phenomenon, and conceptual ideas are introduced. During a lesson, Eric (a chemistry teacher) explained that the liquid in a mixture needed to separate. He asked if anyone knew a process, and not getting a satisfactory answer, he revealed both the process and names of equipment used. Part of the class discussion is found in Table 3. Most students in his class did not have an everyday term for this process or for the specific parts of the apparatus, thus replace was not a move that he could make.

Effi (a biology teacher), in a lesson on food webs, began her lesson by walking around the room, showing the students an owl pellet. She told the students that she found this and several others in a friend's barn. She asked each table to discuss ideas of what it could be and to write their ideas on the board. A list consisting of poop, hair ball, mummy mouse, rotting cheese, dryer lint, rock, and dried nest was generated. After another round of brainstorming on what they could do to find out more about the 'found item', students began to break apart their pellet. After a few minutes, Effi asked them to begin to eliminate some of their earlier suggestions. She used this as an opportunity to help her students begin to talk more like a scientist (**reposition**) by using some of the question/claim/evidence language (see Table 3, Classroom 4).

In sum, the above teachers utilized the five R-moves flexibly and strategically within the context of their science lessons. Rather than following a prescribed

Table 3 Classroom implementation of reveal and reposition

Classroom 3	Classroom 4
Eric: So how could we separate the liquids in this mixture?	Effi: Table 1, what does your table want to remove from the list?
S: [silent]	S1: The hair ball.
Eric: Talk at your table and try to think how you might do this. [after a minute he calls for ideas but gets none]	Effi: Ah, but you have to tell me more…you claim we can remove the hair ball. What is your support? [she points to the white board where sentence starters are found – We think…. Our evidence is ….]
Erin: The process of separating liquids is call DISTILLATION. [He writes the word on the board]. You need three parts [he draws on the board as he talks]. You need a FLASK to heat the mixture and VOLATILIZE the parts, a CONDENSER of some sort to cool the vapor, and collecting vessel.	S1: We think we can remove the hair ball. Our evidence is that we found feathers and feathers are not in hair balls.
	Naomi: Table 2, what can we remove?
	S2: Dryer lint.
	Effi: [points to the white board]
	S2: Oh, we think we can remove dryer lint. Our evidence is that we found bones.

instructional sequence, the teachers sought moments when each R could be deployed during the course of a lesson. The teachers also recognized when natural and unplanned moments arose and were able to capitalize on unplanned language events.

5 Conclusion

Science teachers need to become familiar with communication models that can help make language processes underlying science instruction more accessible and amenable to reflection and critical consideration. Visibility of language use is essential if science teachers are to effectively meet the linguistic and epistemic needs of ELLs. An important caveat, however, is the need for the inclusion of non-linear models of communication in teachers' tool belts. Science teachers should not be encouraged to conceive of classroom communication simply as an unproblematic and fixed series of instructional steps or phases. Multidimensional models that take into account the fluid and highly dynamic nature of pedagogical action in a more sophisticated manner are also needed. This is precisely the type of pedagogical practice we seek to promote through visual modeling of communicative processes such as repair, accommodation and R-moves.

Lastly, it is also essential to emphasize that there is no such thing as a "magic model." Like SIOP, communication models are merely guiding/reflective tools.

Despite their usefulness for pedagogical planning and implementation, the 5R and repair-and-accommodation models inevitably have limitations and are far from being perfect. Rather than unreflectively subscribing to a particularly model of ELL science instruction, teachers need to approach them critically and flexibly, remain open to adaptation, and continuously look for new ways to improve how content and language are integrated in their specific classroom contexts. When it comes to effectively meeting the epistemic and linguistic needs of ELLs in science, reflective adaptability should take priority over blind fidelity.

Reflection Questions

1. What communication model underlies your own pedagogical practices when teaching science to ELLs?
2. How would you characterize your approach to science teaching in terms of communication processes such as linguistic repair, accommodation, and language/idea orientation?
3. How effective are these communicative aspects of your science teaching approach in promoting ELL student attainment of language and content?

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Part IV
Social Studies

Engaging ELLs' Positionality Through Critical Geography and History in the Social Studies Classroom

J. Spencer Clark, G. Sue Kasun, and F. Fallon Farokhi

Abstract Our approach engages ELL students' positionality through a carefully sequenced critical geography activity. ELL students' awareness of their positionality is vital because their knowledge is based on a worldview that crosses borders and is situated in structures of power. We ask students to create a map of their daily life, list significant places and spaces, and identify their relationships to these places and spaces. Then, students develop a narrative related to their map and use both as primary sources to compare, contrast, and/or corroborate with their classmates. We then discuss the role of positionality in interpreting historical and current circumstances.

1 Introduction

Our chapter discusses an approach to engaging English language learners (ELLs) positionality through a carefully sequenced critical geography activity in the social studies classroom. ELLs' awareness of their positionality–their reflexive and shifting identities vis-à-vis others–is vital to their understanding of social studies content (Helfenbein, 2006; Schmidt, 2017). Their knowledge is often shaped by a worldview that crosses borders, and is situated in structures of power (Gershon, 2013; Gruenewald, 2003). Language is one of many relational aspects of a student's

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positionality that contributes to their worldview and knowledge (Saavedra, 2011). Language also creates opportunities to bridge students' transnational cultures in creating their worldview (Kasun, 2016). While ELLs' worldviews and knowledge can enable their engagement in social studies, this same knowledge can also constrain their engagement if it is not valued, recognized, and situated in the educational context.

Developing ELL students' familiarity with places and spaces that contribute to their positionality help them better engage with social studies content, and provides context or background knowledge for new literacy skills. By understanding how their own circumstances shape their worldview and actions, students can better understand how current and historical circumstances influenced peoples' actions. For our activity, we ask students to create a map of their daily life, list significant places and spaces, and identify their relationships to these places and spaces. We emphasize the transnational possibilities as well, inviting students to include spaces that may cross borders, such as loved ones' homes across borders. While many ELLs do not use transnational to describe themselves, they often openly accept this construct once it is explained. Next, students develop a narrative related to their map and use both as primary sources to compare, corroborate, and contextualize with their classmates. We then discuss the role of positionality in interpreting historical and current circumstances. We have found our activity is beneficial for all students in the social studies classroom, and is particularly beneficial for ELLs.

2 Approach to Teaching Social Studies to ELLs: My Identity as Spaces and Places

Our approach to teaching ELLs social studies content is a series of activities that engage ELLs in thinking, speaking, and writing about their positionality. We also want students to think like geographers (Schmidt, 2017) and historians (Seixas, 2017), and develop the knowledge and skills necessary for engaging authentically with the social sciences (e.g. Five Themes of Geography or Historical Thinking). Engaging students in this activity early in the course introduces them to these social science methods, helps them understand themselves as historical agents, and develops their writing skills.

There are four activities associated with this approach:

1. Map of Daily Life
2. Personal Narrative
3. Compare, Corroborate, and Contextualize, and
4. Reflexive Discussion.

The four activities are sequential, and culminate in student learning that promotes personal and academic growth. These activities typically take 4–6 h, or essentially 1 week of class time. Using these activities to begin the course can be effective for

the teacher to assess ELLs' language abilities, while allowing teachers to acquaint themselves with all their students and build relationships. One of the most heralded aspects of working with ELLs is building relationships, especially for bridging the potential cultural divide between teachers and students, to mitigate students' affective filters that can interfere with language learning (Peregoy & Boyle, 2013). As a whole, these activities scaffold new vocabulary and background knowledge that is authentic to the students' lives and vital to ELLs' language learning.

2.1 Map of Daily Life

Our first activity engages students in critical geography, and develops their understanding of place, space, and identity (Helfenbein, 2006) by creating a map of their daily lives. As students create their maps, we ask them to identify 10–20 significant places and spaces (e.g. Facebook to connect with family members in other communities and countries). We encourage students to think globally, and if they speak with a grandmother regularly in Mexico, they can represent it on their map (e.g. Fig. 1, Google Maps screenshot of "where my abuela lives").

First, students engage in a concept formation to develop the concepts place, space, and identity. Concepts are broad categories of meaning, like the concepts of place, justice, or community. Developing conceptual understanding is vital for learning social studies content and new literacy skills in the subsequent activities. The primary goal of concept formation is for students to be able to provide examples and critical attributes of a concept, as well as a working (not dictionary-based) definition of the concept. For this activity, we focus on identifying and comparing examples of the concepts of place, space, and identity. Our favorite way to engage

Fig. 1 House in Guadalajara, Mexico. (Credit: Keizers (original image) Licensed under Attribution-ShareAlike 3.0 Unported (CC BY-SA 3.0))

our students in concept formation, if students have smartphones or tablets, is for them to take pictures of things in their lives that represent place, space, and identity. This activity is an excellent assignment for the first or second day of school and supports relationship-building among the teachers and students. Like all effective ELL instruction, we recommend you model the activity to exemplify the desired and appropriate outcomes (Peregoy & Boyle, 2013).

Once students bring in their pictures to share, in either small groups or as a class, we lead a concept formation creating lists of examples for each concept. Place is typically an easy concept to develop. Space is a bit more abstract, and we ask students to distinguish a place from a space, since space is more amorphous and where broader activities may occur. Helfenbein (2006) differentiated between place and space, and wrote "Place is the transformation of space through investments; it is space filled with meaning for those who spend time in it" (p. 112). Identity may be even more difficult because students have rarely, if ever, thought about their identity in terms of tangible things. Helfenbein (2006, p.112) describes identity as a product of the interaction between place and space that emerges from the structural limitations and open possibilities acting upon individuals. Be prepared to have students not bring in any pictures for the concept of identity – even after explanation, modeling, or examples – because many do not know what to photograph, or they do not feel comfortable sharing things that represent their identity.

For a more structured approach, in which the purpose would be to build specific vocabulary with ELLs, teachers can create cards with visual and textual examples of each concept, similar to the approaches suggested by vocabulary instruction experts in ESOL (Kinsella & Hancock, 2014). Then, students sort the cards on their own, in groups, or as a class (discussed in the following implementation section). A more efficient, and common, way to engage students with examples of the concepts is to identify examples as a class or in small groups, place them in a graphic organizer on the board, and then discuss the characteristics or attributes of each example that relate to the concept. Both methods allow for more teacher control over students' conceptual development, examples, and vocabulary usage.

Second, students begin creating their map by bounding it, or creating the boundaries of their daily lives. Bounding typically takes more time than anticipated. We encourage non-traditional maps, to account for different types of spaces. This is important given the distinct possibility that ELLs' are transnational beyond an emotional sense, and physically transgress borders. Maps can be created in a variety of mediums. In the past, our students have created their maps by drawing on paper, making models, using flat pieces of cardboard, creating graphic representations, and designing with computer applications. The primary goal is for ELLs to use vocabulary to label their map boundaries, and to explain their choice of labels and boundaries.

Third, students identify 10–20 significant places, spaces, and/or identity experiences (PSIEs) on their maps. To determine significance, students should be able to describe or demonstrate their personal connection to the PSIEs, beyond simple preference. For example, a student's favorite restaurant is not particularly significant;

however, the restaurant a student goes to for special occasions because it is their favorite, is possibly significant. Teacher discretion may be necessary to help students determine significance; however, to engage students' positionality, we suggest allowing students maximum autonomy to choose significant PSIEs on their map to encourage more meaningful representations of their identity. This is beneficial for ELLs because they are able to use familiar aspects of their lives as a foundation when teachers scaffold new vocabulary and knowledge. When using this activity to teach content, students could identify specific historic or community places to build vocabulary or meet specific content-based outcomes or objectives.

2.2 Personal Narrative

For the next activity, students develop a narrative about their map, consider their relationship to each PSIE identified, describe why each PSIE is significant, and reflect upon how each PSIE contributes to their identity. In the narrative development, students typically begin to recognize aspects of their positionality. The map activity helps ELLs frame the narrative around their daily lives and ways of knowing, by using familiar language labels, and connect it to their identity.

First, we provide students with a list of possible PSIE relationships to consider. For example, we explain that relationships are often based on power, gender, ethnicity, language, family, social, economic, religious, or health factors. These relationships vary in each educational context, and some relationships may be as simple as needs or wants, proximity or ease of access, or indoor and outdoor activities. For instance, when we use this activity in elementary classrooms, we focus solely on relationships in the standards for that grade level: self, family, wants and needs, community, etc. Teachers will potentially spend a lot of time, and significant facilitation, helping students think about the relationships with their PSIEs. We typically start facilitating this process with practical questions like: Why do you think it came to mind to put on your map, why do you go there, or what do you do there?

Second, students write a brief narrative explaining their map and chosen PSIEs. We ask students to think about their identity and positionality, with questions such as: What does your map tell you about your identity, life, or priorities? This process can be time-consuming, and teachers may have to help students think deeply about why their relationship to particular PSIEs are meaningful, and how they contribute to their identity. For ELLs, we recommend providing a graphic organizer to scaffold their writing and model this part of the iterative reflection/writing process (Díaz-Rico, 2013). At this point, we often find that students want to revise or add to their maps. As they begin writing and thinking about the implications of their daily lives, they often find their maps lack description and want to make their maps more illustrative of their narrative. Students will eventually share their narrative with the class, which triggers more revisions, as students anxiously anticipate sharing their narratives with classmates.

2.3 Compare, Corroborate, and Contextualize

For the next activity, we want to help students understand their narratives as primary sources about their lives. Students share their map and narrative with their classmates like primary sources to compare their daily lives, corroborate aspects of their shared lived experiences, and contextualize their shared lived experiences in broader cultural, economic, political, and social issues.

First, as a class, we define a primary source and distinguish it from other sources. We describe primary sources, simply, as a source of information that was created at the time students are studying (Lévesque, 2009). We then discuss the students' work as primary sources, as well as the significance of their PSIEs to their personal, their family, and their communities' histories. We provide students another opportunity to revise their narratives, and maps if time permits, now that they understand their narratives as primary sources.

Second, when students are ready, and more confident in their work, they present their map and narrative to a meaningful audience, which is something they know at the beginning of the project. In larger classes, they present in small groups, to make sure students have at least five to ten minutes to present and discuss their narrative with their peers. We provide a graphic organizer for students to use when they are listening and comparing, and model in advance how to provide useful and constructive feedback. We want students to actively listen to their classmates, and corroborate their PSIEs in the next part of the activity. The graphic organizer has five boxes. Four boxes are in the corners of the page, to identify commonality: Common Places; Common Spaces; Common Relationships; Common Significance/Meaning. The fifth box is in the center for student to connect the commonalities in meaningful ways (see Fig. 2).

Third, students corroborate the commonalities in their narratives and maps. This process should be facilitated by students' graphic organizers. For example, students discuss their commonalities and raise questions about the meaning and significance of the commonalities to each other. We often provide guiding questions related to critical geography, such as:

- What are the Places/Spaces/Relationships/Significances you had in common?
- Why do you think those are common?
- Are there alternatives to those places? If so, why do you all choose one over another?

Fourth, we ask students to contextualize their PSIEs, and their subsequent relationships and significance to larger cultural, economic, political, social issues, norms, and trends. Contextualization can be fun, and often very serious with ELL populations, especially given our current political situation and erratic immigration policies. For example, we ask students how these larger cultural, economic, political, social issues, norms, and trends shape or influence their choices, and ask them to explain why they chose one place over another. Regardless, this part of the activity is vitally important because students begin to fully grasp their positionality as

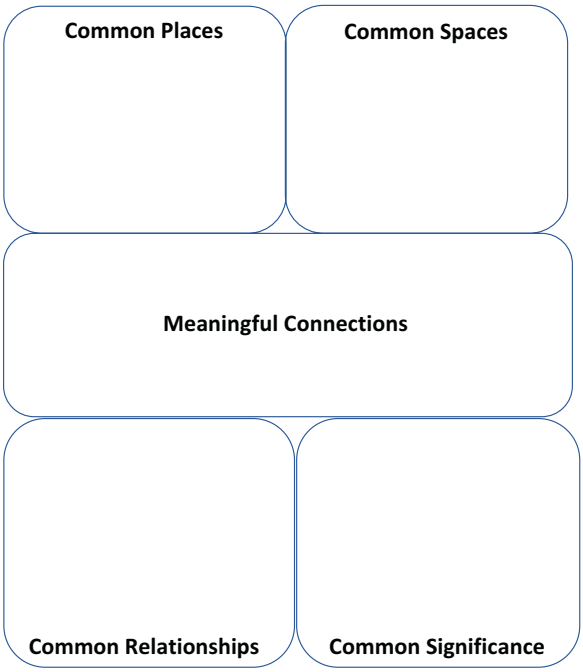

Fig. 2 Example of graphic organizer for student comparison

individuals, and as part of larger groups. This exercise also helps students contextualize peoples' actions in the past. We can refer to this activity when studying historical events, which adds to their significance. For example, when we discuss the Civil Rights Movement, we ask, why did activists choose a lunch counter, or a bus, to exercise their right to protest? Students discuss how the church pulpit was a space where activism was fomented as well. Students make deeper connections to these types of questions, and move beyond the discussion of economics and places of discrimination, to dissect their actions in terms of their positionality. Students recognize those were places of meaning for the activists, and the activists' positions and identities were understood in these places, based on their relationship to the places.

2.4 Reflexive Discussion

To conclude, we build upon the three previous activities, both shared and individual, to discuss how positionality shapes our interpretations of historical and current circumstances. This discussion provides an excellent assessment opportunity for teachers to examine the types of vocabulary ELLs have developed during these activities. The discussion should be scaffolded, by providing sentence starters to structure academic language talk (Kinsella & Hancock, 2014), including, for

instance, starters such as, "I learned that (blank, blank, and blank) are representative of my positionality in my community because (blank)." The point of this discussion it to help students understand their agency and others' agency, based on their positionality. More simply, we want students to understand that people in the past made agentic choices and decisions based on the circumstances in their lives. People in the past constantly faced dilemmas and they relied on their knowledge, relationships, and experiences (positionality) to contextually navigate difficult situations. In this way, we want students, especially ELLs, to understand their positionality is valid and that their actions have historical significance.

3 Theoretical Foundations of the Approach

Our approach uses ELLs' positionality to achieve literacy in social studies classrooms. It highlights ELLs' potential transnationalism--skills to engage their lives spanning borders, whether it be literally across physical borders or emotionally across social media or Skype (Kasun, 2016). It is vital for ELLs to be aware of their positionality because:

> Gender, race, class, and other aspects of our identities are markers of relational positions rather than essential qualities. Knowledge is valid when it includes an acknowledgment of the knower's specific position in any context, because changing contextual and relational factors are crucial for defining identities and our knowledge in any given situation. (Maher & Tetreault, 1993, p. 118)

Developing ELLs' awareness of their positionality is important because their knowledge of social studies content is based on a worldview that crosses borders and is relative to structures of power. We also want to encourage a sense of civic participation for a group that is often treated as marginal in U.S. schools. Our approach represents activities well-suited for the beginning of a course to enable students to access their positionality throughout the course. The activities help students realize and relate meaning in their ways of knowing, while acclimating them to social studies disciplinary skills and thinking.

There is very little literature on engaging K-12 students' positionality, and only in regard to public issues (Klesse, 2010) and historical thinking (Lévesque, 2009). However, Lévesque (2009) noted the importance of positionality in his conclusions, and provided rationale for this activity in writing, "Consideration of the contemporary context represents one (perhaps the best) possible way of examining one's own positionality, as modelled by the community one inhabits" (p. 121). Engaging students' positionality about community issues is related to the recent and growing literature on critical consciousness in civic education (Epstein & Gist, 2015). Critical consciousness entails students being able to identify issues in their everyday lives and understand how to address those issues, or as Godfrey and Grayman (2014) conceptualize it, "the degree to which individuals are able to 'read' social conditions critically and feel empowered to act to change those conditions"

(p. 1801). An underlying goal of these activities is for students to understand their positionality in an empowering way, to better understand ways to name their positionality as a construct and then how to influence their social conditions, individually and collectively.

Reflexively, these activities help educators engage the iterative process of making more sense of their own positionality, as they help their students better understand the respective positionalities of students. When teachers engage their ELLs' positionality, it allows them both to better understand, and be more sensitive to the power relations that are present in the classroom, the school, and the community (Kasun & Saavedra, 2016). There is no end to the sense-making that occurs when teachers embrace an openness to understanding their students' backgrounds through activities such as this one, and contributes to more meaningful connections between the teacher and students. These activities also spark recognition of positionalities and relations of power among students, including between ELLs and English-speaking students. As you will see in the following section, the example of the farmers market in the community demonstrates that meaningful and powerful connections can result from this activity, and also result in shifts in student positionalities.

4 Implementation of the Approach

We share an example of these activities from a 9th grade classroom to illustrate the key aspects in their implementation. The activities relate to secondary Social Studies Common Core Standards (CCSS.ELA-Literacy.RH.9-10.4, CCSS.ELA-Literacy.RH.9-10.6, CCSS.ELA-Literacy.RH.9-10.9), NCSS C3 Framework Geography Standards (D2.Geo.1.6-8, D2.Geo.4.6-8, D2.Geo.5.6-8, D2.Geo.6.6-8, and potentially social studies content standards. Simultaneously, the deep language practice supported in this approach is one side of robust ELL instruction, the other always being the strong design of learning language through content (Díaz-Rico, 2013; WIDA, 2013). This example took place in an inclusion classroom with six Spanish speaking ELLs, and fourteen English speakers. The teacher scaffolded activities minimally for ELLs, as their state-tested English language proficiency levels were all intermediate or higher.

4.1 Map of Daily Lives

First, students engaged in concept formation on the concepts of place, space, and identity. Since all students did not have devices to take pictures, for the activity described above, we prepared a card sorting activity. We provided fifteen pictures: 5 places; 5 spaces; 5 for identity experiences. Figure 3 provides examples from student work. It is important to note that allowing for translanguaging practices, where

Places	Spaces	Identity
home/*casa*	internet/social media	television
school	sidewalk	sports
grocery store/*tienda/bodega*	mountain	grades
basketball court	online games	work
restaurant	fields/*las canchas*	books
park	sending country (Mexico, Honduras, etc.)	church

Fig. 3 Locations on student maps

students are allowed and encouraged to engage heritage and target (Spanish and English, in this case) languages in these instances is critical (for a complete guide on translanguaging in the classroom, see Celic & Seltzer, 2011).

ELLs refer to many places in their heritage languages, and some may only be referred to in heritage language (e.g. bodega). We asked students, in small groups of four, to discuss the cards and sort into categories. Once they sorted their cards, we discussed their decisions as a class. In the discussion, students made arguments for placing many of the places, spaces, and identity experiences in different categories, due to their group's own conceptualization. While this activity created gray, and even overlapping areas among the concepts, students were grappling with differentiating the concepts in their own minds. The goal of this activity was not to have definitive examples of these concepts, but for students to solidify their personal understanding of each concept, as well as the essential attributes of each concept. The personal understanding gained from the card sort discussion helped students think of their own examples, and supported ELLs' confidence in language usage.

Second, the students bound their map. In our example, students created maps by using cardboard (or other items) and adhering an array of objects, of their choosing, to represent the places on their maps. Students bound their maps by choosing the shape of their cardboard and labelling the boundaries. For students who labeled spaces, boundaries were three dimensional, which entailed boundaries above or below the cardboard. One student from Honduras, labelled a social media site as a space by putting his cardboard on a pedestal and running string (representing internet wires, and in the shape of a border) below the cardboard. Several students thought this was creative, and by the end, other students expanded upon their boundaries, with one student making her map appear as to be a bird cage – which she explained in her narrative to be representative of how restrictive her parents' schedules are on her life, and how narrow her experiences are day-to-day.

Third, students added 10–20 significant places, spaces, or identity experiences (PSIEs). Students first made a list of PSIEs. Students were told they would write about the significance of PSIEs on their maps in their narrative. Once students

developed lists, they were given toothpicks and self-adhered labels (e.g. printer labels) to label their PSIEs. We encouraged students to label their PSIEs in other ways too. For example, one student used pipe cleaners to connect all her places into a web, then used the stickers to label them. Our minimum requirement for students was to label the places on the map and signify whether they thought of them as a place, space, or identity experience.

5 Personal Narrative

In our example, we spent more time on the narrative, and even worked with the English Language Arts (ELA) teacher, who provided one class period to work on revisions in her classroom. The activities relation to Common Core Standards allowed both teachers an opportunity at the beginning of the year to assess students' abilities through an authentic writing product.

First, students thought about their relationships to the PSIEs labelled on their maps. We shared some sample relationships, similar to relationships shared the approach section. Describing their relationships is among the most difficult part for students, and proved very difficult for students in this example. Students demonstrated resistance and confusion, asking why they must think more about PSIEs they already signified as important. We attribute this to beginning of the year anxiety, and asking them to share deeply about their identity with new and unfamiliar classmates. Eventually, everyone was on task and making progress. For example, many students labelled home, but their relationships to home were different. Students relationships for home included family, security, power, needs-based (economic), and temporary (we exercise caution when using home as an example, but in this case, we knew our students were not homeless or did not have other instabilities at home). We asked students to share one or two PSIEs and their relationship to those PSIEs, as a group think aloud, to further give students support who might feel stuck in their thinking or grappling with ELL language needs. Creating safe-spaces was a school-wide focus at the beginning of the year, and we cannot overstate the importance of creating the classroom community as a safe-space, especially for ELLs to feel willing to take risks in sharing their work (Díaz-Rico, 2013).

Once students finished thinking about their PSIEs relationships, they brainstormed organizing, connecting, and articulating their PSIEs and relationships in their narrative. This activity also takes substantial teacher support. Students have many options for organizing their narratives. Most common is to have three paragraphs, with each paragraph representing either places, spaces, or identity experiences. Students also developed creative formats based on the meanings of PSIEs they labelled. One student prioritized one place as the anchor of each paragraph, and discussed other PSIEs as related corollaries on her map. Narratives are important because students can explore more deeply why these PSIEs hold importance, and connect PSIEs to their worldview. For ELLs in particular, providing multiple

formats will allow them to explore various approaches to the same genre of writing (Peregoy & Boyle, 2013). For this class, students were given 2-days to work on their narrative.

5.1 Compare, Corroborate, and Contextualize

We began the process of comparing students' maps and narratives with a discussion of primary and secondary sources. This class was quick to realize their maps and narratives were primary sources, and the discussion topic shifted to whose primary sources are considered significant in history. We discussed who is prioritized in our history curriculum and texts, and if prioritizing mostly leaders is justified. Once we finished our discussion we put students in groups of four. We had a timer and allowed each student four minutes to share their narrative, and two minutes to answer questions from their group members. As each group member shared, their group members used the graphic organizer (see Fig. 2) to compare the commonalities across their experiences.

Once all students shared their narratives and maps, they used their graphic organizers to corroborate the PSIEs they shared. We asked them to think about the PSIEs that at least three people in their group identified, and each group shared with the whole class. Then, we asked groups if there were PSIEs that only two students shared. There were, and we asked if any other students also had these PSIEs to demonstrate corroboration across the class.

We discussed the meanings of some common PSIEs to prepare students for the next activity. The farmer's market was a unique common PSIE for this class. The farmer's market is a large, all-day event for the city (population 86,700), and takes over the entire downtown area every Saturday. Each student had experienced it, and 11 out of the 20 students regularly frequented the farmer's market. The farmer's market meant something different to each of the 11 students and their families, ranging from vendors or shop keepers, to regular customers, to purely social experiences. The students' varied relations to the farmer's market made the contextualization activity very powerful.

As we engaged students in the contextualization activity, we used the local farmer's market example to model one potential path for the activity. We asked each student in the class to think about the farmer's market and write down what it meant to them, their family, their friends, and their community. Students shared a wide range of meanings. For one student, the farmers market held very little meaning, but for the 11 students who identified it on their maps and narratives, it was very meaningful – and became more meaningful as we did the activity. Several students explained that the market provided significant income for their families. These students' families represented fruit vendors, craft vendors, and nearby store employees that benefitted from the farmer's market business. Some students' families relied on the market for fresh or specialty produce, and attended nearly every week. For other students, the farmers market was purely social, and represented something to do

occasionally on the weekend. When students heard how much their classmates' families depended on the income, it changed their perspective of the farmer's market and its role in their community.

The farmer's market example helped the entire class think about their positionality, and specifically, how their participation and support of a farmer's market has a broad effect on the members of their community. The farmer's market example also highlighted power relationships in the community, and the teacher recognized the need to address the power dynamics at play among producers and consumers. While the teacher was worried about a sense of fairness among students, many of students who regularly frequented the farmer's market demonstrated their appreciation and gratefulness to their classmates' families who worked at the farmer's market. One student mentioned he had asked his parents if they could set up a stand at the market, to which they replied "no" without explanation. This interaction prompted one student, whose family had a fruit stand, to describe the investment his family has in the farmer's market, as well as all the associated costs. Students explained about their selling strategy and competition at the farmer's market, and ultimately being at the mercy of the environment and their limited resources. Students who only attended the market for social reasons admitted their ignorance, and now understood without their support their classmates' families could potentially lose money. The farmer's market was not merely the casual event many students had come to enjoy, there were consequences for their actions, and it was a space full of dynamics related to commodification, sales strategies, livelihoods, pride of place, social exchanges, and many other previously under-explored relations of power. This brief example expanded students' narrow conception of the farmer's market and helped them understand their positionality.

After the farmer's market example, the students contextualized the places identified in their maps. We had students contextualize in groups around common PSIEs that we heard in the discussion. We conducted this in three 10-minute rounds, allowing students to contextualize several PSIEs. Overall students succeeded in connecting their PSIEs to broader cultural, economic, political, and social issues, norms, and trends. However, some students struggled because they followed the farmer's market example too closely, and required help examining factors not discussed in the example.

5.2 Reflexive Discussion

At this point in the activity, the common PSIEs that students discussed were clear. We used the commonalities between students' positionalities to start the discussion. We started with the "home" example because it was common among students, and easy to use reflexively. The cause and effect relationships students identified in their activities often start at home, either directly or indirectly, and reflexively connect back home. This circular relationship helps students understand that their positionality in one PSIE is connected to other PSIEs. The circular relationship helps

students understand their positionality may shift in certain contexts, but their positions are still rooted in those PSIEs that are most meaningful.

6 Conclusion

Our series of activities could be tailored to any classroom. Regardless of the teacher or classroom, the engagement in these activities is driven by the opportunity for students to exercise agency, individuality, and voice in the classroom. These activities allow students to better understand themselves, their classmates, and their community while practicing a variety of language skills. Additionally, ELLs apply language skills while learning geographic concepts and historical thinking skills that authentically help them understand their communities and world.

These activities provide a space where ELLs have voice, which is meaningfully situated in activities where they can be experts – officially sanctioned as the geographers and historians of their lives. Independent of their proficiency level, any student from advanced-basic proficiency level and beyond can feel successful in this activity and develop conceptual understandings of dense academic concepts, thus emphasizing the best of what we know language education does–teach language through content. These activities recognize and value the experiences of students and allow them to use their own language to develop meaningful understanding of their lives and community. Perhaps, most importantly, yet delicately, is the way these week-long activities allow students to address and dissect issues of power, race, ethnicity, class, and gender in their school and community. This could be seen in the farmer's market example, a topic the teacher would never have thought to address in the classroom. Nonetheless, it culminated organically from the experiences of students in their maps. The farmer's market brought about some important issues of power in their community, issues that the dominate culture were admittedly ignorant about, and issues that crossed linguistic and socio-economic boundaries.

There are many ways to extend these activities, and we conclude with a few ways we have extended the original map activity:

- Map out historical events, the daily lives of people in history, or characters in narratives;
- Map out the school, discuss relationships of power, and how to transgress them as a class;
- Compare inequities in students' community (e.g. differences in public facilities in the same county or city);
- Create transnational, border-spanning maps for both students and transnational historical actors.

Reflection Questions

1. What specific elements from this activity are particularly useful for ELLs in scaffolding their language skills and concept development?
2. What are the advantages of using this activity over approaches to geography and maps made by others?
3. How would you incorporate sensitivity that allows for students from various socio-economic groups to understand how power impacts their choices and decisions?
4. How would you extend the activity to help create deeper spaces of agency for all students?

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Developing Literacy Through Contemporary Art: Promising Practices for English Language Learners in Social Studies Classrooms

Bárbara C. Cruz and Robert W. Bailey

Abstract This chapter describes an innovative approach for teaching English Language Learners (ELLs) that incorporates contemporary art in social studies instruction. A model lesson is included that explores the work of contemporary artist Mary Mattingly and has students consider the ecological footprints left by humans as they interact with their environment. ELLs simultaneously develop important academic skills called for by the Common Core State Standards—such as accurately using academic language, engaging in high-level discussions, and refining diverse and creative thinking—while reflecting on their role as "extractive beings." A university-school partnership that employs curricular interdisciplinarity, relevance to students' lives, and active learning is described. To achieve these goals, ELL-supportive classroom strategies such as rich visual content, word walls, and scaffolded cooperative learning are utilized and discussed.

As the lights were dimmed and the high school students' eyes became adjusted, their anticipation was palpable. They had just completed a project researching various multinational corporations and considered the companies' responsibility to consumers and the environment. Many of them commented that their research had led to changes in their behavior as consumers. As their teacher deftly fielded their comments, providing corrective feedback and genuine praise, he told them that today they would be reflecting on their own practices and sense of responsibility.

As Mary Mattingly's socially conscious sculpture Pull *(2013) was projected onto the screen, quiet descended on the classroom as students studied the art work, some of them coming up to the screen to get a closer look at the image. Using simplified lan-*

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Image 1 *Pull* (2013)

guage and gestures, the teacher presented questions to guide their viewing and analysis: Where is this taking place? What is the woman pulling? How is it held together? Why is she pulling it? What is the artist trying to say with this work? (Image 1)

The teacher then presented vocabulary that students would be encountering in the lesson, pointing out the Word Wall he had started in the classroom. After viewing more of Mattingly's work, the teacher brought closure to the lesson by asking students to reflect and respond to a quote by the artist: "Maybe we need art more today because we're in a world with so many mass produced things." *Students were given sufficient time so that all could consider the piece and think deeply about Mattingly's quote. Then the teacher asked them to write their thoughts down in their student journals. One English language learner tapped on a nearby student's shoulder, "¿Como se dice 'provocar'?" He watched her write down the unfamiliar word in her response: "In the world we live in, art is one of the few things that can provoke change in people."*

The bell rang and it was time for the students to move to the next class. The teacher told them that they would continue the lesson the following day. One student observed that the art they had viewed was really 'weird.' The teacher smiled and said, "Artists can definitely be weird. But they use their weirdness to make us think and feel. Tomorrow you will get an opportunity to do more of both."

This classroom scene transpired in a diverse, secondary, public school social studies classroom with a mixed student population of native English speakers and English language learners (ELL).[1] The teacher, a participant in a project that infuses contemporary art into social studies curricula, had made adjustments to the original lesson so that comprehensible input was provided for all learners. With a few minor modifications, the teacher was able to teach a lesson that used contemporary art to discuss social responsibility. Students were able to explore important social issues, while English language learners had the opportunity to build linguistic competence.

1 Introduction

Now more than ever, students are being asked to accurately use academic, domain-specific words and phrases that will prepare them for college and career. These literacy expectations are delineated in the *Common Core State Standards* (National Governors Association, 2010) and in the *College, Career, and Civic Life* (C3) *Framework* (National Council for the Social Studies, 2013), both calling for students to engage in high-level discussions that evidence reasoning and promote diverse and creative thinking. Developing these skills can be especially challenging for English language learners (ELLs) who are in the process of acquiring vocabulary in a new language and who typically have more difficulty with expressive (rather than receptive) language. In no subject in the school curriculum is this truer than the social studies. Yet academic language development is considered the key organizing principle for ELL academic success (Francis, 2005; Scarcella, 2003). As Salinas, Rodríguez, and Blevins (2017) plainly put it: "For emergent bilinguals in social studies classrooms, the most immediate challenge is language" (p. 444).

The typical social studies classroom has a high cognitive load, evidenced by low-frequency vocabulary terms and specialized jargon not typically used in everyday life (Szpara and Ahmad, 2007). Social studies textbooks and other published materials can also be complex, reflecting complicated syntax (Brown, 2007). Cognitive and linguistic load should also be kept in mind when selecting political cartoons and, especially, primary sources which often include formal and/or archaic language, posing an additional challenge for ELLs (Cruz & Thornton, 2012).

What is called for, then, is a pedagogically sensitive approach to teaching social studies to ELLs. This chapter describes one innovative way for teaching ELLs that incorporates contemporary art in social studies instruction. We present a field-tested lesson that explores the work of contemporary artist Mary Mattingly and has students consider the ecological footprints left by humans as they interact with their environment. We also describe how using such an approach can enable ELLs to simultaneously develop important academic skills used in a number of social studies

[1] Although we are aware that other terms such as "emergent bilinguals" and "culturally and linguistically diverse" learners are currently being used, we've opted to use the more traditional, long-standing "English Language Learner" (ELL) for continuity. We recognize "ELL" is less than perfect and endeavor to identify a more precise, inclusive, and asset-focused term in the future.

content areas, such as accurately using academic language, engaging in high-level discussions, and refining diverse and creative thinking. Last, because the lesson centers on environmental responsibility and consumerism, connections to curriculum standards such as the National Council for the Social Studies' "People, Places, and Environments," "Production, Distribution, and Consumption," and "Global Connections" are made.

2 Approach to Teaching Social Studies to ELLs: Vocabulary Development and Cooperative Learning

There are a number of pedagogical strategies and approaches that have been shown to be effective when working with ELLs (see, e.g., Cruz & Thornton, 2013; Short & Fitzsimmons, 2007; Wright, 2016). Here we will focus on five that are employed in the lesson, "Extraction and Responsibility: Exploring Ecological Footprinting through the Work of Mary Mattingly." We have found these five strategies—developing vocabulary, maintaining a "word wall," utilizing visually-rich materials, providing students with a "viewing guide" with word bank to accompany any video clips used in class, and using scaffolded cooperative learning such as Think-Pair-Share—are useful and effective in simultaneously developing language skills and facilitating social studies understanding.

Vocabulary Development: Anyone who has ever studied and learned another language knows that acquiring basic vocabulary in the target language is key to comprehension. Before students can conjugate verbs or even string simple sentences together, merely knowing words and simple terms can help them make sense of the foreign language swirling around them. For ELLs, vocabulary development is crucial for meaning-making (August et al., 2005). With knowledge of some key vocabulary, even ELLs in the very early stages of language development can point to details in an image and use simple descriptors and terms to express thoughts (Cruz & Thornton, 2012). Pre-teaching critical vocabulary to ELLs is an effective instructional practice that benefits all students (Gersten & Baker, 2000).

Word Walls: Typically associated only with elementary school classrooms, Word Walls are especially helpful for ELLs (regardless of grade level) and are of value for all students, particularly if the words are outside the regular course of study. The strategy is essentially a systematically organized collection of words displayed on a wall or other large display place in the classroom. Typically, they are high-frequency vocabulary words that are used in a unit of study; for secondary classrooms, brief definitions should accompany accurate spellings. Because of the abstract nature of many social studies-related concepts, Word Walls can be particularly useful in social studies classrooms. For ELLs, including illustrations or other graphic representations increases the "comprehensible input" (Echevarria, Vogt, and Short, 2012), that is, language that can be understood by learners. Variations on the Word Wall strategy include the creation and maintenance of personal dictionaries and the construction and utilization of flashcards.

Visuals: The use of visuals and demonstrations has been shown to be an effective way to make content understandable for ELLs (Echevarria, Short, & Powers, 2010). The social studies are particularly fruitful for visual content that can be used with ELLs (Cruz & Thornton, 2013). Historical photographs, maps, charts, and graphic organizers are just a few of the social studies visuals that can be used successfully with all students. Scholars have concluded that linguistically responsive teachers regularly utilize pictures, illustrations, maps, and videos to support instruction that develops academic knowledge and skills (Lucas, Villegas, & Freedson-Gonzalez, 2008).

Viewing Guides: A viewing guide accompanies a film or video clip so that students' attention is focused on key concepts. It facilitates comprehension for ELLs when it is reviewed in class as an advance organizer. Providing questions, cues, and advance organizers help students develop understanding (Hill & Miller, 2013). In our practice, we have found that presenting students with questions they are to answer while viewing results in better comprehension and engagement. Further, including a word bank of key terms that will be encountered in the video clip offers students language support. Online dictionaries that include images illustrating word meanings are especially helpful; these can be used by both students and teachers as they create resources for classroom use.

Scaffolded Cooperative Learning: Having opportunities for output, that is, being able to *use* language, positively impacts an ELL's rate of language acquisition (Skehan, 1998; Wright, 2016). Yet most classrooms offer few occasions to participate in extended language use (Truscott & Watts-Taffe, 1998). In addition to interactions with the teacher, being able to interact with other students in English is crucial if they are to develop academic language skills (Egbert & Simich-Dudgeon, 2001; Truscott & Watts-Taffe, 2000). However, since ELLs in a given classroom are often at different stages of language development, providing learning opportunities that are scaffolded can greatly increase their comfort level in speaking in their new language.

The value of cooperative learning in ELL instruction has been well-documented (see, e.g., Calderón, Slavin, & Sánchez 2011; Cohen, 1994; Hill & Miller, 2013; Montecel & Cortez, 2002). Pyle, Pyle, Lignugaris/Kraft, Duran, and Akers (2016) reviewed 14 studies and determined that peer-mediated interventions, such as cooperative learning, result in positive effects on students' phonemic awareness, vocabulary, and comprehension when compared to teacher mediated strategies. Well-structured cooperative learning activities can provide ELLs with opportunities to engage in extended language use in a sheltered environment. In our experience, Think-Pair-Share exercises can be especially effective because they provide all students, especially those who take a little longer, a chance to reflect and collect their thoughts; they then can practice speaking with just one other person in a sheltered format; and finally, the entire class benefits from a group discussion.

3 Theoretical Foundations of the Approach

Inside Art is a visual literacy program that integrates social studies with contemporary art in an examination and discussion of critical societal issues. This university-school partnership uses contemporary art as a springboard to discuss a variety of

topics that are relevant to students' lives and the world at large (Mead, Ellerbrock, & Cruz, 2017). The theoretical underpinnings of the program are anchored in interdisciplinarity, curriculum relevance, and an active learning pedagogical approach.

By *curricular interdisciplinarity* we mean a synthesis and integration of knowledge, skills, and methods that are culled from a variety of content areas, such as geography, civics, history, and economics. We agree with Jacobs (1989) that the growth of knowledge calls for an integrated, interdisciplinary curriculum and believe, as Hinde (2005) declares, that "integrating the curriculum is a powerful and useful pedagogical tool" (p. 107). Past social studies themes explored in the *Inside Art* curriculum, for example, have included human rights, environmental degradation, urbanization, and homelessness. Because these issues transcend any one discipline, we draw upon the social sciences, the natural sciences, and the visual arts to explore them. Social studies educators, science curriculum developers, and visual arts specialists work together to develop curricula that is meaningful and reflects real-world problems and understandings.

Relevance in the curriculum is also central to the program's goals. Effective teachers know that providing connections between school subjects and students' lives often results in learners who are more motivated and interested in classroom lessons. Research has shown that this practice is critical for a diverse student body in the twenty-first century (see, for example, Hulleman & Harackiewicz, 2009; Villegas & Lucas, 2002; Westheimer & Kahne, 2004). As such, all lessons in the *Inside Art* curriculum focus on issues and topics that are important for students, their local communities, and the world in which they live.

To gain and maintain high levels of student interest and participation in learning activities, an instructional approach that emphasizes *active learning* is evident throughout the curriculum. This approach utilizes a variety of strategies that require students to think critically and be fully involved in their learning. Numerous studies indicate the positive impact this approach can have on students' academic achievement as well as social and emotional growth (see, for example, Durlak et al., 2011; Eison, 2010; Prince, 2004). For ELLs, this engaged, hands-on approach may be especially beneficial since it can provide more scaffolding and more opportunities for active participation (Cruz & Thornton, 2013; Hur & Suh, 2012).

While the *Inside Art* lessons are not developed specifically for ELLs, their visual nature renders them very useful to work with this student population. Social studies teachers in the program use the curriculum to teach social studies content through the visual arts; participating art teachers use the curriculum to enlighten their students about underlying social issues and concepts in contemporary art. Each edition of *Inside Art* features the work of artists showcased in the exhibitions at the University of South Florida's Contemporary Art Museum (USFCAM). In the fall 2016, USFCAM's exhibition was titled *Extracted* and included contemporary artists whose work investigates the extraction of natural resources and the use and circulation of those resources around the globe (CAM, 2016). One of these artists, Mary Mattingly, creates sculptures using her personal possessions, asking viewers to consider everyday objects and how their lives as consumers impact the global economy and Earth's physical environment.

4 Implementation of the Approach: *"Extraction and Responsibility,"* A Lesson in the Use of Natural Resources

In history courses, students often learn how time is defined by length including such concepts as age, epoch, or period. The Anthropocene is a proposed geological epoch that begins when human activities started to have a significant global impact on Earth's geology and ecosystems. In this lesson, students consider how humans are "extractive" beings, leaving ecological footprints by their interactions with the environment, and what their responsibility is in relation to this process. This discussion is particularly appropriate in social studies courses such as Human Geography (the exchanges of natural resources and finished products), Economics (applying economic theory to the allocation of natural resources), Sociology (the role of the environment in social development), and Civics (citizens' custodial responsibility to the planet).

ELL-friendly strategies for this social studies lesson include the creation of a word wall (or personal dictionary), engaging in a critical analysis exercise using visual skills, and participating in a high-level discussion framed with a think-pair-share activity to sharpen both listening and speaking skills. Extension activities provide opportunities for students to examine selected nations' ecological footprints as well as reflect on their own daily activities and their impact on the planet.

4.1 Extraction and Responsibility: Exploring Ecological Footprinting through the Work of Mary Mattingly

Estimated Time for Completion of Lesson: 2 class periods
Intended Grade Levels: Grades 6–12
Social Studies Courses: Civics; Environmental Studies; Government; Law Studies; Geography; Economics
Instructional Objectives: Students will:

- define unit-specific vocabulary by maintaining a "word wall" or personal dictionary;
- describe and analyze the work of Mary Mattingly through a guided visual analysis exercise;
- analyze and consider humans' responsibility to Earth by viewing a video and engaging in a think-pair-share activity;
- practice and develop spoken and written academic English;
- sharpen critical thinking and writing skills by writing a reflection in their student journals.

Curriculum Standards:

NCSS National Curriculum Standards for Social Studies Learning Expectations (NCSS, 2011)

People, Places, and Environments: explore the impact of human activities on the environment; develop informed civic decision-making about human-environmental relationships

Production, Distribution, and Consumption: understand the economic choices that people make have both present and future consequences; compare personal economic decisions with those of others and consider the wider consequences of those decisions for groups, communities, the nation, and beyond

Global Connections: become informed about serious global issues; explore the causes, consequences, and possible solutions related to persistent, current, and emerging global issues; consider how individual behaviors and decisions connect with global systems.

Common Core

CCSS.ELA-LITERACY.RH.6-8.6: Identify aspects of a text that reveal an author's point of view or purpose (e.g., loaded language, inclusion or avoidance of particular facts).

CCSS.ELA-LITERACY.RH.6-8.7: Integrate visual information (e.g., in charts, graphs, photographs, videos, or maps) with other information in print and digital texts.

CCSS.ELA-LITERACY.RH.9-10.4: Determine the meaning of words and phrases as they are used in a text, including vocabulary describing political, social, or economic aspects of history/social science.

CCSS.ELA-LITERACY.RH.9-10.8: Assess the extent to which the reasoning and evidence in a text support the author's claims.

CCSS.ELA-LITERACY.SL.9-10.1.C: Propel conversations by posing and responding to questions that relate the current discussion to broader themes or larger ideas; actively incorporate others into the discussion; and clarify, verify, or challenge ideas and conclusions.

CCSS.ELA-LITERACY.SL.11-12.1.C: Propel conversations by posing and responding to questions that probe reasoning and evidence; ensure a hearing for a full range of positions on a topic or issue; clarify, verify, or challenge ideas and conclusions; and promote divergent and creative perspectives.

CCSS.ELA-LITERACY.SL.9-10.1.D: Respond thoughtfully to diverse perspectives, summarize points of agreement and disagreement, and, when warranted, qualify or justify their own views and understanding and make new connections in light of the evidence and reasoning presented.

Social Studies C3 Framework

D1.5.9-12. Determine the kinds of sources that will be helpful in answering compelling and supporting questions, taking into consideration multiple points of view represented in the sources, the types of sources available, and the potential uses of the sources.

D2.Eco.1.9-12. Analyze how incentives influence choices that may result in policies with a range of costs and benefits for different groups.
D2.Eco.15.9-12. Explain how current globalization trends and policies affect economic growth, labor markets, rights of citizens, the environment, and resource and income distribution in different nations.
D2.Civ.13.9-12. Evaluate public policies in terms of intended and unintended outcomes, and related consequences.
D2.Geo.4.9-12. Analyze relationships and interactions within and between human and physical systems to explain reciprocal influences that occur among them.
D3.2.9-12. Evaluate the credibility of a source by examining how experts value the source.
D4.7.9-12. Assess options for individual and collective action to address local, regional, and global problems by engaging in self-reflection, strategy identification, and complex causal reasoning.

Materials and Resources: Computer, Projector, Speakers; "Mary Mattingly (ELLs)" PowerPoint; Word Wall resource sheet; *Mary Mattingly Owns Up* viewing guide; "My Possessions" worksheet.

Day 1: Learning Activities Sequence:

Attention-Getter (5–7 min)

1. Access the PowerPoint presentation, "Mary Mattingly (ELL lesson)" from the Inside Art web site (http://www.ira.usf.edu/InsideART/Inside_Art_Extracted/InsideART_2016_Extracted_files.html). You may need to make some modifications to the lesson and PowerPoint based on your students' specific linguistic needs. Project slide 1 on a screen for all students to view. Give students 2–3 min to view the image, allowing them to inspect the image close-up to make out individual elements, if they wish.
2. Guide their visual analysis and whole-class discussion by asking:

   - Where is this scene taking place? Point to the things in the image that makes you say that.
   - Describe the scene.
   - What is the person doing?
   - Describe what she is pulling—what is the ball of things made of?
   - How is the ball held together?
   - Why do you think she is pulling the ball of things?

In simplified language, explain that this image is a work of contemporary art called *Pull*. *Pull* (2013) was created by artist Mary Mattingly. In this work, Mattingly uses a previous work, *Terrene* (2012), a twine-wrapped parcel of her belongings: books, magazines, a lamp, purses, and other household objects. In *Pull,* she then drags this across a city sidewalk, visibly straining with its heft.

Ask students:

- What is the artist trying to say with this work?

Advance to slide 2 (title slide) and tell students that today they will be exploring the work of contemporary artist Mary Mattingly and considering human's responsibility to the environment.

Word Wall (10 min) Announce to the class that they will be creating and maintaining a Word Wall. (An alternate strategy would be to have students create a "personal dictionary," writing the words and definitions in their student journals or specially designated notebook.) Suggested terms for the Word Wall for this lesson are located on the "Word Wall" resource sheet. Words for the Word Wall can be added as they are encountered in the lesson or they can be placed on the wall from the outset. Model the strategy by starting with the three terms on the title slide: extraction, responsibility, ecological footprint (see suggested definitions from the "Word Wall resource sheet").

PPT-Guided Interactive Lecture (15 min) Using the PowerPoint presentation developed for this lesson (resume at slide 3), have students explore Mary Mattingly's work pausing to check for understanding by asking and answering questions. Note that questions and suggestions for discussion have been imbedded in the Notes View of the PPT slides.

Closure and Evaluation (5–10 min)
Advance the PowerPoint presentation to the final slide of Day 1 (slide #8). Have students reflect on and respond to this quotation by Mary Mattingly in their student notebooks (5 min):

> Maybe we need art more today because we're in a world with so many mass produced things. Mary Mattingly

Optional: Ask for student volunteers to share their responses aloud with the class (5 min).

Day 2: Learning Activities Sequence:

Attention-Getter (5–10 min) Access the PowerPoint presentation, "Mary Mattingly (ELL lesson)" from the Inside Art web site, resuming the presentation on slide #9. Tell students they will be continuing the lesson from yesterday and advance the PPT to slide #10. Ask students to think about these questions:

- What does it mean to "throw something away"? Where is "away"? Where does our garbage go?

Allow students a minute or two to reflect individually, then ask for volunteers to answer the question. Engage the class in a brief discussion.

Explain to students that some cities charge people per trash can that they put out for collection. Ask: is that fair? Why or why not? Tell students that today they will continue to reflect on the work of contemporary Mary Mattingly and reflect on individuals' responsibility for the objects they consume and throw away.

Viewing Guide and Video Clip Access the video, *Mary Mattingly Owns Up* (http://www.art21.org/newyorkcloseup/films/mary-mattingly-owns-up/) and have it ready for viewing in the classroom. Distribute the Viewing Guide for *Mary Mattingly Owns Up.* Review the questions with the students, clarifying any queries they might have. Allow students to review the Word Bank before viewing (you can also review the list as a class). Ask students to view and listen carefully, answering the questions in writing on the Viewing Guide as they view the video clip. Pause the video periodically so that students have an opportunity to write down their responses on their Viewing Guides.

[Alternate Strategy: Access the 24-image slideshow of *Mary Mattingly Owns Up* (http://www.art21.org/newyorkcloseup/images/mary-mattingly-artist-at-work/#013-nycu-production-mattingly). Each slide is accompanied by a short description of the image which can be paraphrased as needed.]

Research: Documenting Personal Objects (10 min) Have students visit Mary Mattingly's web site, "Own-It.US" (http://own-it.us) [alternately, the web site can be accessed by the teacher and projected in the classroom for all to see]. Have students peruse Mattingly's possessions. Photocopy and distribute the "My Possessions" handout. Ask them to make a list (pre-production ELLs may draw pictures) documenting their own possessions (slide #14), reflecting on objects' origins, purpose, and likely future [alternately, students may be allowed to photographically document their list]. Although this assignment will be completed as homework, allow the students to document one or two items (have them look in their pockets, purses, and backpacks) while they are in class to ensure they understand the process (Fig. 1).

Closure: Think-Pair-Share (15 min)
Advance to slide #15, projecting the questions and asking students to first reflect individually, then discuss in pairs, and finally as a whole group. [Before commencing activity, refer to the Word Wall for the definitions of some of the terms used in the questions.]

- Whenever the earth's surface experiences a major change, geologists declare a new epoch. Because of all the recent changes on the planet made by humans, some geologists have called for a new epoch, called the Anthropocene (humans + geologic period). Do you agree that we need the creation of this new epoch?
- Mary Mattingly says all of us are "extractive beings." To extract means to pull out or take. How are humans "extractive beings"?
- There are some people, companies, and nations that use more of the earth's resources than others. Should they be required to pay more for these resources? Should they be required to clean the environment?

Evaluation (10 min)
Advance the PPT to the final slide (#17). Have students respond to this prompt in their student journals (5 min):

- When you are buying something, do you ever think about how it might affect the earth? Give an example.

Ask for volunteers to read aloud their responses and share with the group. (5 min).

"My Possessions"

Like Mary Mattingly, make a list (you can use words or pictures) that documents your own possessions using the table below.

Possession (item or object)	Purpose of the possession (what it's used for)	Origins (country and/or company)	Likely future of the possession (How long is it expected to last? What will happen to it once its use is finished?)

Fig. 1 My possessions worksheet

Alternately, this writing activity can be completed as homework.

Optional Extension Activities

Online "footprint" quizzes: Allow students to take an online quiz to determine the ecological impact they are having on the planet. Some possibilities include (slide #18):

- Global Footprint Network: http://www.footprintnetwork.org/en/index.php/GFN/page/calculators/
- World Wildlife Fund: http://footprint.wwf.org.uk/
- The Nature Conservancy: http://www.nature.org/greenliving/carboncalculator/
- Earth Day Network: http://www.earthday.org/take-action/footprint-calculator/

The "Happy Planet Index" (HPI): The HPI measures human well-being and environmental impact, giving higher scores to nations with lower ecological footprints. Access the worldwide map and results at: http://www.happyplanetindex.org/. Have students consider: Which countries in the world have the highest HPI? Which countries have the lowest HPI? What are some possible reasons for these results?

Internet Links

http://www.marymattingly.com

A visually rich source detailing the life and work of artist Mary Mattingly including several links to her projects and personal thoughts.

http://own-it.us

Some of artist Mary Mattingly's work examines the physical belongings we carry with us throughout our lives. This website explores those objects and asks how those objects define us.

https://www.youtube.com/watch?v=gujH5oYmHcY

A short film (9:22) that follows artist Mary Mattingly as she designs and reflects on her work in her Greenpoint studio. The film follows her as she moves the art across the Bayonne Bridge from Staten Island into New Jersey.

https://art21.org/artist/mary-mattingly/

Art21 is a nonprofit dedicated to inspiring a more creative world through the work and words of artists. The link provides a brief summary of Mary Mattingly's portfolio along with several videos.

https://www.artsy.net/artist/mary-mattingly

Artsy.net is a one-stop shop for everything art related. The site allows visitors to search out local artists, shows, galleries, and auctions near and far. Artist Mary Mattingly is prominently featured. The site requires registration.

http://www.artinamericamagazine.com/news-features/interviews/life-of-objects-an-interview-with-mary-mattingly/

Art in America Magazine was a widely circulated and respected journal covering the humanities for over 100 years, sadly ending its printed publication in 2015. This interview, conducted and written by author/contributor Greg Lindquist, provides a rare glimpse into artist Mary Mattingly's creative process.

5 Conclusion

Socially-conscious contemporary art can be a useful vehicle for the discussion of global issues in social studies classrooms. As shown with this lesson, accommodations that have been found to be effective with ELLs can help make the input comprehensible and enable all students to be engaged learners, considering important social issues in government, civics, economics, and geography.

In the class described in the opening of this chapter, students wrapped up their thoughts by participating in a think-pair-share exercise, some ELLs working together, some working with native English speakers. Three ELLs (each at varying levels of language production) in one small group defined "extractive being" in their own words: "it means us taking part of the environment away, but then later filling it with trash." Another pair—made up of one ELL and one native English speaker—offered, "It means to be a constant consumer, especially of resources." In a Civics course, this offers a critical teaching moment to discuss citizens' custodial relationship to Earth. As students reflect on their actions as consumers, teachers can probe further, asking them to consider their responsibility as citizens.

When asked to reflect on their personal responsibility for the objects they acquire, two ELLs working together responded: "Before we hold the *people* responsible, we need to hold our politicians, presidents, and leaders responsible for global warming." Another ELL who had been in the U.S. longer, added: "If we continue to purchase items from companies who commit intolerable acts, the only ones to blame are the individuals who continue to feed those corrupt companies." A follow-up activity would be for students to write to businesses or legislators, asking them to take action on reversing planetary degradation.

Not all students felt the same level of personal responsibility; some opposed a proposed ecological tax on people with a higher consumer footprint. One ELL responded: "Because waste is common in everyday life and some things I buy are expensive, I shouldn't have to pay to throw it away." Two other students working together said: "If they have to pay an ecological tax, the poor will find a way to throw away their trash (in an inappropriate or illegal manner), like sofas and beds, on the side of the road." Arguments and counter-arguments were presented by the students, resulting in a lively discussion.

At the end of the lesson, one ELL summarized her "take-away" thusly: "What does the artist hope her art will accomplish? To help people realize they don't need that much stuff."

Reflection Questions

1. What modifications are present in this lesson to make the input more comprehensible to ELLs?
2. What are other works of art that can be used in a social studies classroom to discuss global issues?
3. What art projects might help ELLs express their understanding of social studies content?
4. What instructional modifications have you observed or used in your own classroom that have been effective with ELLs?

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Visual Biography and Citizenship: Biography Driven Instruction in the Social Studies Classroom

Jillian Baldwin Kim, Alexander Cuenca, and Amy Yun-Ping Chen

Abstract For social studies education to embrace its full potential as the curricular subject that prepares students for citizenship, it must engage in pedagogies that cultivate students' social, civic, and cultural fluency. In order to bridge the culturally and diverse lives of English Language Learners with the promise of social studies education, teachers must be able to surface their contextualized civic realities. In this chapter, the authors suggest a biography-driven instructional approach provides an opportunity to learn about students' civic lives. More specifically, we share how the construction of a visual biography through photography can be used to personalize the rights, responsibilities, and spaces of citizenship.

1 Introduction

Despite the definitional debates that loom over the academic definition of social studies education, the field as a curricular subject in P-12 schools has consistently located its purpose in educating for civic interdependence. Although the degree to which the disciplines that constitute social studies explicitly focus on citizenship education varies, the pathway to prepare children, youth, and adolescents for civic interdependence is most clear in the social studies curriculum. The field of social studies is an enterprise in humanity through its exploration of interactions – historically, geographically, politically, or economically – within a social system. Unfortunately,

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teachers oftentimes strip the humanity away from social studies. When social studies fails to connect with students, it most often fails because teachers fail to acknowledge, recognize, and/or leverage students' sociocultural milieu and fundamental humanity. For example, studies by Rubin and Hayes (2010) and Epstein (2009) illustrate how the disjuncture between the everyday experiences of students of color with discrimination creates dissonance with teachers' sweeping presentation of social studies absent of discrimination. This disjuncture not only leads to a detachment from lessons of social studies, but is also reified into a fundamental disbelief of the fidelity of the promises of democracy for marginalized citizens (Cohen, 2012).

For social studies education to embrace its full potential, it must locate pedagogy in ways that leverage disciplinary content knowledge to serve the social, civic, and cultural fluency of the students in the classroom. Certainly, this aspiration may seem daunting given the multiple social and cultural identities that exist in the United States. However, if interdependent citizenship in a pluralistic society is the outcome of the social studies curriculum, then failing to draw on the diversity that already exists in the social studies classroom hampers both civic learning and the prospects of living in an inclusive and just democracy.

One of the richest opportunities in the social studies classroom to advance a pluralistic society are the lives, experiences, and stories of English language learners (ELLs). English learners are a subgroup of the larger culturally and linguistically diverse student population and, despite the deficit label placed on them, bring with them a wealth of knowledge and experience. The percentage of ELLs has steadily increased in the last decade, totaling more than 4.5 million students or 9.3% of the total public school student population (English, 2018). The array of perspectives from the various backgrounds that constitute the ELL population provide social studies educators with multiple opportunities to enhance the civic capacities of all learners in the classroom. Unfortunately, much of the research indicates that ELLs feel marginalized by the formal social studies curriculum (Banks, 2013; Cho & Reich, 2008) and that this lack of connection leads many to believe that social studies is irrelevant to their everyday lives (Rierson, 2006; Salazar & Franquiz, 2008). ELLs may feel frustrated in their middle and high school social studies courses as they face increasingly abstract vocabulary steeped in cultural contexts, fewer hands-on experiences, and literacy-heavy curriculum (O'Brien, 2011). "With more rigorous standards and higher learning expectations, ELL students in U.S. high schools require meaningful instruction that takes their English proficiency level and educational background into account" (Pawan & Sietman, 2007, p. 71). Once again, the prevalent disconnect between curriculum and student is a disservice to learners and a missed opportunity to cultivate the norms of citizenship.

In order to bridge the lives of ELL students with the curriculum, teachers must work to excavate students' everyday knowledges and literacies. This stance demands that teachers are knowledgeable about the intricacies of students' sociocultural realities and are able to connect those intricacies with academic content knowledge. By prioritizing student knowledge over content knowledge, the scope of the curriculum widens and not only provides a more meaningful learning experience for marginalized students, but also broadens the perspectives of traditional students. With a

greater range of socially and culturally situated perspectives available to all students, social studies educators can more intentionally create experiences that cultivate the habits and dispositions necessary in a pluralistic democracy (Hess & Ganzler, 2007).

The initial step in surfacing the social and cultural realities of ELL students is the discovery of the relevant histories, cultural practices, and daily experiences that envelop these students. In this chapter, we draw on the work of Socorro Herrera (2015) to delineate a biography-driven instruction that can help social studies educators interrogate and leverage academic content for the benefit of ELLs in particular, but also for the civic development of all students in the classroom. The biography-driven instruction requires teachers to develop a student biography that culls sociocultural, linguistic, cognitive, and academic information; configure groupings based on the diversity of the biographies within a learning community; and share with students the objectives of learning sequences derived from their biographies. With this approach, teachers, teachers create a low-risk learning environment that engages learners in language practice and also provides information that assists in scaffolding cultural relevance into curriculum and instruction. As such, biographies provide teachers with conceptual and practical frameworks to approach their students holistically. Below, we explicate the biography-driven instruction, justify how this approach promotes English language acquisition, and provide an example of how to connect biography-driven instruction and a discussion of the rights, responsibilities, and places of citizenship.

2 Approach to Teaching Social Studies: Biography-Driven Instruction

Biography-driven instruction (BDI) aims to facilitate teachers in integrating theory and practice and transforming students' lives into practical applications. The approach begins with the *a priori* understanding that every student has her or his own narrative, which significantly impacts development, action, perspective, and behavior. Collier (1995) indicates that the relationship of language development, social and cultural process, cognitive development, and academic development are inseparable. All of these components are inextricably linked and have a profound influence on language acquisition. Specifically, for English language learners, cultural and linguistic factors play an important role during their time in classrooms and schools not only academically but also socially, physically and emotionally.

Biography-driven instruction is comprised of a variety of holistic elements that show the importance of "be[ing] aware of the many changing family and individual dynamics of students in order to set positive conditions for learning, harvest[ing] what is known throughout the lesson, and assess[ing] what students bring to classrooms" (Herrera, 2015, p. 20). When working with students from diverse backgrounds, it is imperative to consider student growth from both school-situated and

biographical contexts through multiple layers that can accelerate language and content learning. Four interdependent and complex dimensions are important in social studies teachers' planning, design, delivery, and evaluation of curriculum and instruction: **sociocultural**, **linguistic**, **cognitive**, and **academic**.

The **sociocultural dimension** represents the power of students' cultural assets that they bring to school from home resources and environments. Teachers need "insight into how their students' past learning experiences have shaped their current views of school and school knowledge" (Villegas & Lucas, 2002, p. 26). Teachers should acknowledge students' heritages and family backgrounds and conduct certain scales of studies in relation to students' classroom data and personal information. These processes allow teachers to analyze the learning opportunities that are, or are not, viable to their students within different academic tasks and social participation structures. As Cummins (1996) states:

> When students' language, culture and experience are ignored or excluded in classroom interactions, students are immediately starting from a disadvantage. Everything they have learned about life and the world up to this point is being dismissed as irrelevant to school learning; there are few points of connection to curriculum materials or instruction and so students are expected to learn in an experiential vacuum. Students' silence and nonparticipation under these conditions have frequently been interpreted as lack of academic ability or effort, and teachers' interactions with students have reflected a pattern of low expectations, which become self-fulfilling (as cited in Herrera, 2015, p. 28).

Therefore, it is important to utilize students' funds of knowledge and blend the biographic information into lessons that makes the content more relevant and connected to students' individual learning processes. Importantly, the incorporation of students' cultural assets in teaching reorganizes school practices in ways that solve the issue of dichotomy about educational outcomes, and teachers are able to respond successfully to the culturally relevant conflicts and to facilitate students in effectively achieving their goals.

Today's school requirement of fluency in English language usually neglects the linguistic and cultural possessions that students may have and mainly focuses on the skills and outcomes. However, the **linguistic dimension** requires teachers to look at language from multiple angles. Language learning is always dynamic, which involves different elements such as culture, context, form, expression, thoughts, comprehension, and communication (Lightbown & Spada, 2013; Saville-Troike, 2012). The biopsychological perspectives also state that development of humans from the biological, social, and psychological changes should be concerned with the study of each language (Herrera, 2015). Herrera (2015) pinpoints:

> When we fully consider the linguistic dimension of the culturally and linguistically diverse student biography, we recognize that language, literacy, and learning are greatly influenced by the culture and community in which a student has been socialized. We begin to understand the importance of providing opportunities for students to participate in the learning process and demonstrate their understanding in ways that differ from those traditionally found in schools (p. 39).

It is necessary to think about students' culturally situated thoughts and explore their interpretations of text and knowledge through the lens of their life experiences and

cultural assets in order to bolster student learning and increase the academic achievement of each student.

In addition, the **cognitive dimension** provides opportunities for students to showcase their thoughts and ideas. The dimension explains the relationship that students' brains are able to process and learn what teachers instruct through relevant knowledge and sociocultural experience (Collier, 1995; Herrera, 2015). Thus, it is imperative for teachers to adapt the theoretical foundations of instructional practices associated with language acquisition and cognitive development with the purpose to constantly give learners with the appropriate and adequate access, hope, support, encouragement, and engagement for better understanding of the materials that are taught. Moreover, Herrera (2015) points out the importance of student learning strategies related to conscious mental and behavioral procedures. Jensen (2008) also indicates that "in order to get learner to be creative and have greater subject interest, higher self-esteem, and the ability to be reflective, there must be intrinsic motive" (as cited in Herrera, 2015, p. 52). Teachers need to find the ways to increase student motivation, offer students with the necessary tools to take responsibility for their own learning process, and help students move progressively toward comprehensive understanding and skill acquisition. Significantly, while teaching students from diverse backgrounds, giving them the learning opportunity with low-risk elements and combining the learning with culture and experience can result in strong impact on students' emotional and behavioral developments toward the success of linguistic and academic growth (Thomas & Collier, 2012).

Finally, the **academic dimension** emphasizes the potentiality of learners. The level of the academic performance of students on language proficiency should depend on the linguistic, biopsychosocial, cultural, and cognitive states (Herrera, 2015). Many studies have presented the problems of traditional school-initiated practice such as standardized test scores deprive students of opportunities (Ladson-Billings, 1994; Ravitch, 2010). According to Gay (2010):

> Much intellectual ability and many other kinds of intelligences are lying untapped in ethnically diverse students. If these are recognized and used in the instructional process, school achievement will improve radically. Culturally responsive teaching is a means for unleashing the higher learning potentials of ethnically diverse students by simultaneously cultivating their academic and psychosocial abilities (p. 21).

There is much need for learners to have a sociocultural responsive environment through the emphases on not only academic proficiency but also emotional, cognitive, social, cultural, and physical developments. In essence, teachers ought to understand and utilize multiple ways of instruction to bridge content knowledge and language skills with students' life experiences and cultural assets. Teachers also need to constantly ensure student access to any learning opportunities in order to facilitate students in overcoming the higher grades in coursework and fostering the increase of academic achievement.

Knowledge is a synthesis of personal meanings and life experiences, which also should be considered to be individual centered and not object centered. The creation of knowledge involves in personal interaction with history, culture, experience, and

environment. Teaching and learning need to be viewed as a continuous discovery process for both teachers and students. Providing students with diverse tools and accesses that bolster their development is a necessary and ongoing task, which should not be avoided in our educational practices.

Given the centrality of the individual in the biography-driven instruction, this approach has potential for the social studies classroom for a few reasons. First, social studies is a natural curricular space to integrate instructional methods that value students' home cultures and languages into lessons based on geography, history, economics, government, and culture. Recognizing self within society is an initial step in learning how to participate as a citizen. When the BDI approach is nested within the social studies curriculum, the focus on individual and family dynamics affords social studies learners opportunities to engage in activities that cultivate personal political consciousness. Second, several studies indicate that middle and secondary social studies teachers struggle with ELL instructional methods. O'Brien (2011) for example, found that secondary social studies teachers considered integrating ELL methods difficult because they felt neither adequately trained in effective ELL instructional methods nor fully supported by school ELL staff. These findings echo others studies that feature pre-service or in-service social studies teachers, who often claim that their curriculum is already too full to add any additional elements, even if those elements have been demonstrated an ability to aid student success. The student-centered approach taken by biography-driven instruction allows social studies teachers a flexible methodology grounded in the humane essence of social studies that simultaneously caters to the unique needs of individual learners and adds to the civic capacities of all learners.

2.1 Theoretical Approach to Biography-Driven Instruction: Culturally Responsive Teaching

The theoretical foundations of biography-driven instruction are located in the concepts and ideas of culturally responsive teaching. Culturally responsive teaching is an educational approach that implements "the cultural knowledge, prior experiences, frames of reference, and performance styles of ethnically diverse students to make learning encounters more relevant to and effective for them. It teaches to and through the strengths of these students" (Gay, 2010, p. 31). Biography-driven instruction, like culturally responsive teaching, embodies the significance of acknowledging students' cultural heritages and bridging the connection between home and school.

Culturally responsive teachers "teach the whole child" (Gay, 2010, p. 32) and not only concentrate on teaching academic outcomes, but are also aware of students' physical, emotional, cultural, and social learning. The teaching of culturally responsive teachers is centralized in the concepts of cultural relevance and responsiveness,

which requires the incorporation of diverse teaching and learning materials and the establishment of various formative and summative assessments practices. Using student-generated images or examples and understanding students' learning preferences are essential components (Irvine, 2008). Teaching and learning should focus on the experience of a wide range of knowledge, perspectives, and developments. Significantly, empowerment aids students in recognizing their own value and worthiness while working toward becoming a diligent learner and a committed citizen. Culturally responsive teachers should always hold high expectations for their students, be sensitive about the risks of learning, and offer adequate resources and support. The ultimate purpose is to equip students with skills and capacities in order to promote justice and fairness in personal and social arenas.

As Darling-Hammond (2006) stated, "pre-service [and in-service] teachers may never learn to incorporate other kinds of knowledge or develop needed skills if they are not challenged to address their assumptions and perceptions" (p. 36). With the aim of promoting the transformative agenda of culturally responsive teaching and combating biases, discrimination, and prejudices, it is necessary that teachers should understand the ways of challenging the dominant power and the notion of traditional education. Teachers also need to have solid foundations and beliefs about equitable education in order to raise social and cultural awareness and cultivate good citizens with critical thinking among students. Essentially, the core idea of culturally responsive teaching associated with the concept of emancipation is located at the student-centered instruction and authentic knowledge. Students should be motivated to be problem solvers (Irvine, 2008). In this respect, culturally responsive teaching as the theory that undergirds BDI aligns with the overarching goals of social studies education, which is to engage in practices where students are not only asking meaningful question, but also reflecting on possible solutions (Barton & Levstik, 2004). Students' freedom of thinking allows them to approach learning thoroughly and foster more insightful understanding of interconnections among self, group, society, nation, and worldwide (Gay, 2010). As a consequence, with the support of culturally relevant and responsible teaching, all students certainly can be challenged to be critical citizens in an interdependent society. Despite the challenges that teachers often face to accommodate the rich lives and forms of knowledge that English language learners bring to classrooms (Lucas, 1997; Ruiz de Velasco et al., 2000; de Jong & Harper, 2005 in Pérez, Holmes, Miller, & Fanning, 2012), the adoption of biography-driven instruction is generative for other kinds of culturally responsive teaching practices. As the research of Herrera, Holms, and Kavimandan (2012) suggested, when teachers implement biography-driven instructional strategies, they show "greater fidelity" to other culturally responsive teaching practices as a means to improve the academic achievement of ELL learners (p. 14).

3 Implementation of Biography-Driven Instruction

3.1 Investigating the Lives of Learners through Photovoice

Classroom implementation of biography-driven instruction begins with teachers investigating the biographies of their students in order to place culturally and linguistically diverse students at the center of instruction. Although learner-centered instruction is neither new nor unique to biography-driven instruction, the methodology provides social studies teachers with effective strategies in which to practically apply culturally responsive teaching in their classrooms. Typically, these biographies are created using a variety of data collection techniques from both quantitative and qualitative research including interviews, observations, artifact analysis, surveys, as well as standardized test score analysis. However, for this social studies lesson, we draw on photovoice techniques to visually leverage students' biographies for civic learning.

Photovoice places cameras in the hands of disenfranchised youth in order to give voice to their lives, beliefs, perspectives, and concerns. As Graziano (2011) suggested, "Photovoice sets out to convey the point of the person holding the camera. It invites us to look at the world through the same lens as the photographer, to share the story the picture evokes for the person who clicked the shutter" (p. 2). For the construction of the visual biography, ELL students ought to possess or be provided with a photographic device such as a smartphone or a digital camera. Students will then be directed to capture images that represent different dimensions of biography-driven instruction: **sociocultural, linguistic,** and **academic.** For the **sociocultural dimension** students must capture images that represent demographic information from their home or community. Items or scenery that represent who they and what they value such as: the home, street, or community where they live, meaningful individuals in their lives, and artifacts from their country of origin. Since the **linguistic dimension** attempts to illuminates language from multiple angles, students ought to capture images of texts that students notice surround them in their homes, schools, and communities. Teachers should ask ELL students to take photographs of the signs they encounter in school and recreational spaces, books or websites they enjoy reading, and other texts they engage with. The **academic dimension** expands the values achievement from the standpoint of the skills and knowledge that ELL students bring from their homes and communities. Therefore, ELL students should take photographs of aspects of their lives that they believe represent success and express a particularly unique talent, skill, or achievement in their lives. Viewing success from the student lens provides social studies teachers with an understanding of the places where students have already found success and the nature of the contributions that individual students can make to the classroom community. Finally, the **cognitive dimension**, which provides insight into how students process information, is perhaps best captured not through photographs, but through the rationalization of the photographs they selected for the other three dimensions. To prompt student learning, ELL students ought to select two to three photographs that

represent who they are (sociocultural dimension); the texts that surround them (linguistic dimension); and the achievements in their lives (academic dimension) and for each picture answer the following questions:

- Describe your picture.
- What is happening in your picture?
- Why did you take a picture of this?
- What does this picture tell us about you or your life?

Through this question protocol, which was proposed by Wang and Burris (1997), social studies teachers will have an opportunity to view the cognitive interplay between knowing, thinking, and communication. The selected photographs and their rationalizations can be compiled and presented on either a paper medium such as a notebook or poster board or a digital medium such as a blog post or PowerPoint slides.

3.2 Connecting Visual Biographies to Civic Lives

A powerful extension of the visual biography would be to explicitly connect students' visual biographies to their rights and responsibilities of democratic citizens. Because citizenship is the ethos that runs through the social studies subjects of history, economics, geography, and civics, creating connections between self and participation in a democratic society provides a basis that can be used across all of social studies disciplines. To explicate the lesson, we use a useful three part framework suggested by MacDonald, Miller, Murray, Herrera, and Spears (2013) to overlay biographies in instruction: Activate, Connect, and Affirm (ACA). The activation phase serves as the lesson opener and allows students to create connections to content goals based on previous knowledge. For a lesson on the rights and responsibilities of citizens, the activation phase begins with teachers engaging students in questions about their beliefs and the behavior of citizens in a democratic society (e.g., voting, staying informed of local, state, and federal issues, and respecting the beliefs of others), and the kinds of places where citizenship takes place. Once students' answers have been solicited, teachers should sketch out any basic rights, behaviors, or responsibilities not already identified, discuss any major contrasts between citizenship as defined in their social studies class versus views expressed in their homes, and ensure that students' understand both the rights and responsibilities of citizenship and where the acts of citizenship take place (e.g., voting in a polling place, protesting unfair police practices at a police station). After this conceptual framing occurs, teachers then move to the connection phase, where students link new knowledge with background knowledge. During the connection phase, teachers can help students review their visual biography and identify two possible connections: (1) the ways in which individual attributes identified in their photographs can be used to understand and express the rights and responsibilities of citizens; or (2) spaces that exist in their everyday lives where civic participation takes place or needs to take place. The role of the teacher during this phase is to facilitate the

connection between the students' contexts and the various modalities of citizenship. One way to surface possible connections between the biography photographs and the rights, responsibilities, and places of citizenship is to have students interrogate how they answered the final cognitive question (How can this picture provide opportunities for us to improve life?). In what ways can this answer serve as a basis for the need for civic expression? The identification of connections can also be done in strategically arranged small teams in order to create shared meanings between students. Finally, the affirmation phase provides an opportunity for students to share their process and products. Once students make a connection between their photographs and the rights, responsibilities, and places of citizenship, they can share with the whole class how the photograph is civically meaningful. Throughout these presentations, teachers should not only be affirming these individualized expressions, but also look for patterns between contexts and expressions of citizenship to discuss with the whole class. Based on students' contexts for citizenship, teachers can extend the affirmation phase and develop projects where students take collective informed action in their communities, homes, schools, and classrooms. For example, using the various modalities of citizenship that exist in the classroom, teachers can locate (or create) service projects that accentuate students' individually identified expressions of citizenship.

Developing students' habits of citizenship in the social studies classroom is intimately tied to the everyday civic realities of students' lives. As Biesta, Lawy, and Kelly (2009) succinctly argued, contexts matter in citizenship education, since different contexts "provide different opportunities for acting and being, and thus different opportunities for citizenship learning" (p. 17). By asking students to develop a visual representation of their sociocultural, linguistic, and academic selves, and cognitively rationalize those representations, social studies teachers are given important glimpses into the contexts that shape the civic realities of ELL youth, and can use those glimpses to inform other enactments of the social studies curriculum (Fig. 1).

Phase	Purpose of Phase	Role of Students	Role of Teacher
Activation	Opening	Build connections between previous and new knowledge	Observe, Learn, Analyze, Frame
Connection	Work time	Work independently, collectively, and cooperatively to create understandings of content and language objectives	Confirm/disconfirm understandings, Track cognitive moves
Affirmation	Closing	Share self-created products, explain process, and reflect on new knowledge	Affirm learning and progress during sharing of student artifacts

Fig. 1 Lesson phase summary

4 Conclusion

Contrary to other deficit-oriented ELL methodologies, biography-driven instruction celebrates the expansive funds of knowledge that ELL students bring to the classroom. Biographies provide social studies teachers with more resources and a platform to expand the curriculum from the traditional narratives that tend to disengage marginalized populations that often fail to be represented in the canon of social studies. Given the charge of social studies to prepare citizens for democratic life in a diverse and interconnected society, a biography-driven instruction provides a significant entryway for surfacing diverse perspectives, and cultivating the civic self in the classroom.

Reflection Questions

1. What aspects of my personal and civic biography can be used to create meaningful connections with my students? What aspects of my personal and civic biography create distance with my students?
2. In what ways can I use the information gained about my students from their visual biographies in other curricular moments within the social studies curriculum?
3. How can I use the civic knowledge shared among students in this activity to create classrooms where there is mutual respect for diverse perspectives and opinions?
4. Based on the collective knowledge that emerged from the civic biographies in your classroom, what kinds of constructive, independent, or collective civic actions (e.g., service projects, communication campaigns, voter registration drives) are necessary and/or possible in your local community?

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Thinking Inside the Box: Using Graphic Novels to English Language Learners in the Social Studies Classroom

Carla K. Meyer, Laura J. Mahalingappa, and Kristy A. Brugar

Abstract Too often in social studies classroom teachers rely too heavily on textbooks; yet, textbooks are often criticized for their challenging structures, demanding conceptual loads, and heavy language loads. Nonetheless, educators cannot ignore the recent call for reading in the content areas. This chapter will detail how to use a Sheltered model that incorporates an explicit focus on disciplinary language needs and development to teach English Language Learners history while investigating the role graphic novels and reflective inquiry play in their instruction.

Over the past decade, many literacy and history education researchers (e.g. Moje, 2008; Nokes, 2010) have called for a different approach to social studies and history instruction. Instead of relying on lecture, textbooks, and generic reading strategies as the backbone of content instruction, the education field has moved toward the concept of disciplinary literacy. Disciplinary literacy is an instructional approach that focuses on teaching K-12 students the skills and strategies experts in the discipline use (Shanahan & Shanahan, 2012). Thus, classroom instruction emphasizes "the ways of thinking and knowing in a discipline as key to learning how to reason, read, write, and discuss" (Monte-Sano, 2011, p. 213). Reflecting this shift towards disciplinary literacy, The National Council for the Social Studies (NCSS), which is the professional organization for teachers of social studies, adopted the *College, Career, and Civic Life (C3) Framework* in 2013. The Inquiry Arc of the *C3 Framework* consists of four dimensions that emphasize students' use of the skills and strategies used by experts in fields within social studies.

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Historical literacy is dependent on using interpretive skills in order to learn historical content (Lee, 2005; VanSledright, 2012) and to critically analyze and synthesize our understandings of the past. These skills employ distinct reading processes and practices (Bain, 2006) such as analyzing historical narratives, determining authorship, and understanding context (Wineburg, 2001). The C3 dimensions also call for the use and analysis of multiple sources: primary, secondary, and tertiary. These texts include discipline specific language which is challenging for all students, but especially for our students who are English language learners (ELLs); these students are still in the process of acquiring general grade-level academic English language proficiency. We argue using graphic novels as one of the texts included in a history classroom can scaffold the historical learning of ELLs.

But first, what exactly are graphic novels and why should teachers use them in the history classroom at all? For the purpose of this chapter, we define graphic novels as book-length narratives in the comics medium (Jiménez & Meyer, 2016), and comics as sequential art which use linguistic, visual, and spatial elements to tell a story impossible to tell without each element (McCloud, 1994). Perhaps due to their likeness to comics, graphic novels appeal to today's students (Brozo, Moorman, Meyer, & Stewart, 2013). In fact, research has demonstrated that graphic novels engage and motivate reluctant readers in ways traditional print-based texts do not (Connors, 2010). Many history educators recognize the appeal of graphic novels in the classroom, (e.g., Cary, 2004; Hawkins, Lopez, & Hughes, 2016). As such, these texts have a growing role in schools' sanctioned curricula (Dallacqua, 2012).

Recent research has begun to investigate if graphic novels foster historical content learning. In one study, Hawkins et al. (2016) conducted action research to determine whether the graphic novel *March, Book Two* (Lewis & Aydin, 2015), used in collaboration with additional historical texts, influenced student learning. The authors used the graphic novel to scaffold understanding of primary sources documents in two tenth-grade heterogeneous United States history classes. The results suggest that when used in combination with other sources, graphic novels impacted the participants' learning. In pre- and post-assessments, participants provided more detailed answers on the post-assessment than on the pre-assessment. In particular the authors noted an ELL from one class was unable to provide any information on the pre-assessment but was able to provide substantial information on the post-assessment.

In another recent study, Brugar, Roberts, Jiménez, and Meyer (2017) investigated the use of a graphic novel, *One Dead Spy* (Hale, 2012), to teach sixth-grade historical content. The authors used a repeated measures design to measure participants' background knowledge and free recall of content knowledge before and after instruction. Participants received instruction for 7 days in which the participants were taught how to *read* graphic novels. After the instructional cycle was completed, participants completed a curriculum-based post-test designed to measure students' knowledge of the topic. The short time frame of the study meant that students were unlikely to learn about the content of the book from sources other than the intervention. The results of this study support the argument that students can learn historical content from historically-accurate graphic novels.

In a final example, Clark (2014) investigated whether historical agency could be taught using graphic novels. In a preservice history education class, the author used six historically accurate non-fiction graphic novels in an attempt to build both historical and personal agency in the participants. Participants in the study were asked to read one graphic novel and discuss the text in both literature circles and as a whole class. Using qualitative data analysis the author identified three ways in which the participants connected to historical agency: (a) upbringing and personal experience, (b) unpredictability of historical situations, and (c) injustice. These three examples showcase the possibilities of using graphic novels as a tool to teach history.

In the remainder of this chapter we illustrate the use of graphic novels to scaffold ELLs' learning of historical content. We examine the ways graphic novels can provide a multimodal approach to support ELLs' content and language learning and then provide a specific example of how to integrate a graphic novel into an inquiry-based lesson.

1 Using Graphic Novels as a Multimodal Approach to Teaching Social Studies to ELLs

Educators can use graphic novels to support ELLs in a variety of ways. First, graphic novels are often culturally relevant and engaging (e.g. Boatright, 2010; Danzak, 2011). Research documents that ELLs may have difficulties when attempting to learn historical content (e.g. Brown, 2007; Cho & Reich, 2008) due to their different cultural and educational backgrounds. Specifically, ELLs are likely to have a limited knowledge base of American cultures and customs that serve as background knowledge for new learning (Cruz & Thornton, 2009). Good instructional practices for supporting ELLs in inclusive content-area classrooms emphasize the need to build background, scaffold essential vocabulary, and help construct the necessary cultural schema to engage with instructional material (Echevarría, Vogt, & Short, 2010; Rance-Roney, 2010). Graphic novels are an engaging tool to help scaffold and build that cultural knowledge for ELLs.

Second, educators support the use graphic novels with ELLs because of their format. Among other strategies to provide supports to ELLs, Cruz and Thornton (2009) suggest social studies teachers use pictures, graphics, maps, and other visuals to provide the language scaffolding needed for ELLs to make meaning from text. Graphic novels, a type of multimodal text, naturally provide these types of support since they incorporate linguistic, visual, and spatial cues to convey meaning (Jiménez & Meyer, 2016). These various modes of communication provide access to information which otherwise may be beyond the learners' language abilities (Mathews, 2014; Park, 2016a, 2016b). Visual elements, such as images, colors, lines, and panels, convey information such as mood, tone, emotions, motion, setting, and even narrator. In addition, graphic novels require the reader to intentionally attend to the visuals to gather important background information (e.g., physical characteristics of

a character to determine age, gender, etc.). Reading a graphic novel requires the ability to combine text and graphical elements to infer what is not directly written in the text (Brugar et al., 2017). In other words, the visual and spatial cues provide critical scaffolds which promote ELLs' knowledge of historical language, and in turn, improve their historical content knowledge (Cruz & Thornton, 2009).

Another feature of graphic novels that benefits ELLs is that they do not typically incorporate long blocks of text. Unlike traditional-print text, which relies on lines and paragraphs, written text in graphic novels typically occurs in short blurbs using a variety of graphic tools such as speech and thought bubbles, call out boxes, and text boxes (Meyer & Jiménez, 2017). Text is typically no more than a sentence or two; even lengthier passages are brief in comparison to traditional-print text. The presentation of the text in graphic novels also provides access to information. For example, speech and thought bubbles cue the reader as to who is speaking and thinking. Call out boxes provide background or additional information to the reader. Each presentation of text plays an important role, and with proper instruction, the reader can easily determine the purpose of the text. Thus, graphic novels provide text in smaller chunks that lessen the heavy language compared to traditional academic texts.

2 Theoretical Foundation of Using Graphic Novels as Multimodal Text to Teach Social Studies to ELLs

In social studies subjects, such as history, many texts have a heavy language load (i.e., higher tiered vocabulary, complex syntax), which may cause difficulties for ELLs' reading comprehension and limit their access to historical knowledge (de Oliveira, 2011; Schleppegrell, Achugar, & Oteíza, 2004). Historical literacy is not simply students learning how to read historical-specific texts; rather, it is a complex task that involves the development all language skills including reading, writing, listening, and speaking (Cruz & Thornton, 2009; Echevarría et al., 2010). To support ELLs in inclusive history classrooms, teachers must incorporate methods that scaffold historical language and content in meaningful and engaging ways.

By using comprehensible input (Krashen, 1982), teachers can provide scaffolded text (textual or visual) in such a way that students can understand it. The proficiency levels of students and the levels of the texts need to be considered in order to make the historical content comprehensible. If the language, and by default the content, is not comprehensible, learning will not occur (Cruz & Thornton, 2009). ELLs need repeated exposure to materials at the right level of English proficiency to truly acquire the language of the social studies classroom (Cruz & Thornton, 2009).

Developing ELLs' historical knowledge should focus on language as a means to make meaning in various contexts through both linguistic (vocabulary, grammatical) and non-linguistic (pictures) resources (Halliday, 1994). While social studies classrooms have traditionally focused on the printed word (Clark, 2014), multimodal texts are becoming increasingly used (Serafini, 2010). Multimodality in all levels of

instruction, including texts, can be used "to engage ELLs, to scaffold content learning, to reinforce what was learned linguistically, to make subject-matter content knowledge relevant to their lives, and to serve as a culminating project for a unit of study" (Choi & Yi, 2016, p. 318). Choi and Yi (2016) found that multiple modes of instruction, can "help ELLs gain nuanced understating of subject-matter content-knowledge" and help build their sense of accomplishment and self-esteem (Choi & Yi, 2016, p. 304).

Moreover, the use of graphic novels to help develop ELLs' disciplinary literacy and support their content learning in the social studies classrooms answers the call for the incorporation of multimodal texts and integration of visual information under Common Core State Standards (Siegel, 2012), which are set of learning standards adopted by over 40 states in the U.S. As a form of multimodal texts, graphic novels include visual and spatial elements which convey information. Subsequently, graphic novel readers (i.e., ELLs) must examine semiotic resources such as color, font, panel layout, gutter space, point of view, line, printed text, and gutter space (Pantaleo, 2014). The reader must use skills and strategies, which go beyond print-based comprehension strategies. As multimodal text, graphic novels must be analyzed in new interactive ways (Serafini, 2010). These analysis skills in turn foster visual literacies.

3 Implementation of Graphic Novels to Teach ELLs

In this section, we provide an overview of what our approach looks like in a middle-level (grades 5–8) classroom with an inquiry-based lesson to promote critical-thinking skills. We begin with what should be completed prior to instruction, providing an outline of the various activities and including specific examples of how we would support ELLs.

3.1 Preparing for the Unit

Preparing for the unit involves a multistep process. First, identify a concept and question that can be traced throughout history, will facilitate students' critical thinking, and can be linked to learning standards. In this unit, we use the essential question, "How do individuals/people challenge injustices?" to align with the second thematic strand of the NCSS Curriculum standards: Time, Continuity, and Change (NCSS, 2010, p.15), more specifically described as

> Knowledge and understanding of the past enables us to analyze the causes and consequences of events and developments, and to place these in the context of the institutions, values and beliefs of the periods in which they took place. Study of the past makes us aware of the ways in which human beings have viewed themselves, their societies and the wider world at different periods of time.

In addition, integrating anchor standards of the Common Core State Literacy Standards for History and Social Studies (2010) (number 9 below) encourages students to think critically about historical events:

> (9) Draw evidence from literary or informational texts to support analysis, reflection and research.

The next step is selecting a high-quality graphic novel which will build students' background knowledge and vocabulary while piquing their curiosity about the topic. This unit uses *Underground Abductor* (Hale, 2015) for several reasons. First, Nathan Hale's writing and illustrations are clear, concise, and accessible for the intended audience – middle grades (5–8) classrooms. Just like traditional-print, text graphic novels differ in their complexity and accessibility, so it is important to choose a graphic novel with language and content at the appropriate level. Second, Nathan Hale works are known for their historical accuracy. In fact, the NCSS recognized *Underground Abductor* as a Notable Social Studies Trade Book for Young People (2016). Finally, Harriet Tubman is a central figure in American history who exemplifies the ways in which individuals can work to fight against injustice (e.g., enslavement) for a better society.

After selecting the graphic novel, the third step is to analyze the text to assess the complexity of the linguistic and semiotic elements – the language demands of the text. This analysis provides a basis to identify challenges the book would present to ELLs and help determine potential scaffolds. *Underground Abductor* is intended for a middle grades, thus the linguistic structures can be complex and the vocabulary more advanced. The novel can challenge ELLs in terms of the content, yet provide some inherent scaffolds throughout the text via the visual supports. After linguistic elements, there should be a focus on identifying the multimodal design elements found in the graphic novel since learning to read multimodal text does not come naturally (Jiménez & Meyer, 2016). Table 1 lists design elements that are typically used by graphic novelists. The design elements are key to unlocking the potential of multiple modes used to convey the historical information, concepts, and interpretations in the text. Without the knowledge of how elements such as character, hue, and

Table 1 Design elements of graphic novels

Element	Definition
Characters	The physical characteristics and interactions of those involved in the novel
Color and hue	The gradation (hue) and saturation (intensity) of color used to convey/communicate meaning
Graphic weight	The way an image draws the readers eye over another image
Gutter	The space between the panels, usually white space; the reader imagines the actions that links the two panels
Line	A basic building block of illustrations; lines express mood, senses, and/or motion
Panel	A division of time and or space usually indicated by a line
Text	Can include call outs, speech bubbles and text boxes

line work, students may try to solely rely on the printed-text, not using the scaffolds afforded to them by the visual and spatial cues.

The fourth and final step in the preparation phase involves identifying ELLs' language needs and language-development goals. First, language needs are an important consideration throughout the preparation of all lesson activities and assessments in order to incorporate appropriate modifications of activities, materials, and assessments. In order to identify these language needs and goals, the proficiency levels of the students must be determined. Many states in the U.S. use English Language Proficiency Standards (ELPS) based on English Language Development (ELD) Standards produced by the WIDA Consortium (2016), an educational consortium of U.S. state departments of education. These standards help educators understand what students at varying proficiency levels (Levels 1–5) can understand (Reading and Listening domains) and produce (Writing and Speaking domains) according to specific content areas and grade levels. The ELPS provide "Can-Do Indicators" that help differentiate instruction by providing detailed examples of what students can do by the end of the proficiency level. For example, for the Writing Domain for grades 6–8, students can "Explain by":

- At Level 1: "Indicating relationships by drawing and labeling content-related pictures on familiar topics" and "Describing processes or cycles by labeling diagrams and graphs";
- At Level 3: "Comparing and contrasting information, events, or characters" and "Producing descriptive paragraphs around a central idea";
- At Level 5: "Producing informational text around graphs and charts" and "Comparing content-related ideas from multiple sources in essays, reports, and narratives" (WIDA, 2016, p. 7).

Comparing the language demands of the text (i.e., sentence and vocabulary complexity identification in the previous step) to the Can-Do Indicators helps determine the language needs of each class activity, material, and assessment and provides the basis for the development of scaffolds and appropriate modifications. This unit example assumes there are three ELLs from different language backgrounds and with varying proficiency levels.

Finally, language-development goals should be explicitly stated as language-development objectives for all ELLs. Based on an understanding of the language demands of the text and students' current English language proficiency levels, language development objectives can provide a guide to help teachers support students' language development. For example, in all texts there are key vocabulary that students must know or learn in order to understand the text. Using students' current proficiency levels and identifying students' vocabulary needs with regards to the text provides vocabulary-based language objectives for this unit.

Beck's, McKeown's, and Kucan's (2013) approach to tiering vocabulary puts vocabulary into different tiers: everyday language (tier 1), general academic language (tier 2), and discipline specific academic language (tier 3). In many cases, tier 1 and tier 2 words can be objectives for ELLs at Levels 1, 2, and 3, and tier 3 words can be objectives for ELLs at Levels 3, 4, and 5. In chapter one of *Underground*

Abductor, tier 2 words (1. Slavery/Slaves, 2. Property, 3. Human, 4. Despicable, and 5. Labor) are contained in the language objectives for ELLs at Levels 1–2. For students at Levels 3 and 5, language objectives include tier 3 vocabulary items such as: 1. Abductor, 2. Underground Railroad, 3. Triangular Trade, 4. Raw Materials, 5. Manufactured Goods. Beck et al.'s (2013) approach recommends teachers provide student-friendly definitions for each word in advance. These definitions should only use words appropriate for the targeted students. This same process can be used to create objectives that focus on phonology (pronunciation), syntax (sentence structures), or discourse (e.g., paragraph structure).

3.2 Introducing the Unit

In this unit, we recommend introducing the essential question and encouraging students to brainstorm their initial responses. In the example, students brainstorm answers to the question "How do individuals/people challenge injustices?" and think of examples of ways they think/know that this happened. Students use a think-pair-share (TPS) activity. Each student should be given 5 min to jot down a current or historical event that they think match this theme. Students should be encouraged to use whatever medium they want, for instance, free writing, sketches, word association, and semantic maps, among others. After the 5 min are up, students get into groups of three-four and create a poster representing their collective thoughts and share it with the class.

For this activity, certain modifications can be incorporated to scaffold the activity for ELLs. For instance, for a student at Level 1 or 2, the essential question itself can be scaffolded for comprehension either by translating the questions into their L1 (first language) or by allowing the student to use a dictionary or receive an oral explanation of the question from the teacher. In the TPS activity, all ELLs should feel free to use their L1 to brainstorm their ideas in addition to sketching out their ideas. Finally, before breaking into the groups, ELLs can be given some time to compose their ideas into either written or spoken English with the aid of the teacher.

3.3 Introducing Graphic Novels

After launching the unit, students should be introduced to graphic novels. It is important to remember that students have had varying levels of experience with graphic novels, some with no experience. Thus, when using graphic novels in a class for the first time, there should be some instruction in how to read and interpret graphic novels. By teaching ELLs in particular how to use the semiotic cues to read graphic novels, the students will establish visual literacies skills required to read a wide variety of sources. In this unit example, design elements (see Table 1) are used to implement a three-part lesson on how to read graphic novels (see Table 2 for example lesson plans). Table 2 also presents the language objectives and modifications for each step of this process.

Table 2 Instructional scaffolding

Lesson number: title	Lesson content objective	Lesson overview	Language needs or objective
1: Introduction to graphic novels I: panel, frame, gutter, line, color, hue, and graphic weight.	1. SWBAT identify example of different design elements used in graphic novels. 2. SWBAT explain how different design elements communicate information in a graphic novel.	1. Ask students to describe how to read and make sense of a graphic novel in a journal. 2. students to select a graphic novel and read for 5–10 min. 3. Have students return to journal and compare their experiences reading the graphic novel with their description. 4. Introduce graphic novel features: Panel, frame, gutter, line, color, hue and graphic weight. 5. Display the features and their definitions on the anchor chart. 6. Ask students to use sticky notes to identify examples of these features in graphic novel of their choice. 7. Have students leave "sticky thoughts" on the sticky notes detailing how the element adds to the meaning of the story. 8. Add student examples of each feature to an anchor chart with definitions and examples of each feature.	1. Language objective: SWBAT use identified graphic novel vocabulary words by labelling elements in the graphic novel (levels 1 and 2) or by providing written examples and definitions of the words. 2. Language needs: Vocabulary specific to graphic novels and narrative genre for journaling. 3. Language scaffold: Visuals or modelling needed to introduce target academic vocabulary. 4. Language scaffold: Model sentences or sentence starters in statement form for describing graphic novels and to compare and contrast. 5. Language scaffold: Sample definitions and examples in graphic organizer and sticky notes to lesson language load for level 1 and 2 students.

(continued)

Table 2 (continued)

Lesson number: title	Lesson content objective	Lesson overview	Language needs or objective
2: Introduction to graphic novels II: depiction of characters, variation in text, and graphical devices; thinking about meaning making.	1. SWBAT identify example of different design elements used in graphic novels. 2. SWBAT explain how different design elements communicate information in a graphic novel. 3. SWBAT compare and contrast how to access information in a graphic novel and a traditional-print novel.	1. Review features from previous lesson, using anchor chart created from student examples. 2. Introduce additional graphic novel features and add to anchor chart: characters and text. 3. Have students identify examples in their graphic novel and leave sticky thoughts about how these elements provide meaning information. 4. Add student examples to the anchor chart. 5. Instruct students to create a Venn Diagram in their journals. 6. Ask students to compare and contrast the various ways you glean information from a graphic novel and a traditional-print novel.	1. Language objective: SBWAT orally name design elements of a graphic novel to the teacher (level 1) or in groups (level 2); SWBAT orally compare and contrast how information is transmitted in graphic vs. traditional novels (levels 3–5). 2. Language needs: Grammatical structures including simple and complex declarative sentence structures to expalin design elements, compare and contrast structures (i.e., is more colorful than, has more pictures than, has this but that one doesn't, etc.). 3. Language scaffold: Provide model sentences and sentence starters and/or semi-completed Venn diagram.
3: Introducing the class graphic novel	1. SWBAT use graphic novel design elements to make sense of a graphic biography. 2. SWBAT to summarize information learned through reading a graphic biography.	1. Complete book talk for underground abductor and link the graphic novel to the essential question. 2. Review the design elements introduced in the previous two lessons. 3. Conduct a think-aloud using chapter one of the graphic novel in which you model how to approach this graphic novel. Note how the graphic novel linked to the essential question. 4. Have students read chapter two and use sticky thoughts to note how the author used the designed elements in this book. 5. Add student examples to the anchor chart. 6. Have students create a summary of chapter 2 in a mode of their choice (paragraphic, graphic organizer, pictures, etc.). 7. Have students complete a turn and talk about their summaries. 8. Select volunteers to share what they have learned to the class.	1. Language objective: SWBAT write a summary of chapter 2 through labelled pictures (level 1) or in outline (level 2) or essay (levels 3–5) form. 2. Language needs: Vocabulary important to chapter 2 WH-question structures outline and paragraph models and structures. 3. Language needs: Grammar for WH-Question structures and outline and paragraph models and structures.

3.4 Engaging Students in Active Learning

The unit itself includes several stages. First vocabulary should be introduced. Teachers should provide a vocabulary journal in which students write down the provided student-friendly definition. Next the students read through the chapter with a partner or in groups and identify the word in context. The student should note the illustration that supports the vocabulary word and write the panel and page number in which the illustration appears. Next, the students should further explore the format of the text. Students should continue reading. Reading and discussing the text could take a number of different formats. The students could read independently and then pair up for discussion or they could be in pairs or groups and read aloud the novel.

Once the students are comfortable reading the format, students should be able to read the remainder of the book independently. One suggestion is to provide the students with some kind of graphic organizer to guide and organize their reading. We use two column notes in our example lesson. In the right column, students note important information from the text. For the purpose of the unit, important information would be defined as the actions of Harriet Tubman that challenge injustice. In the left column, students clarify how these actions prompted/supported challenge to injustice. ELLs should receive teacher guidance and modelling for the activity. ELLs at lower levels of English proficiency can also be offered a word bank, or partially completed graphic organizers.

After reading, the students work with partners to create different level questions: factual (e.g. what happened), conceptual (e.g. how did what happened lead to change), and debatable (e.g. were her actions justifiable) which can be used for a culminating discussion once the text is finished. For this part of our unit, ELLs can be paired up with a peer who speaks their L1 or one who can provide some help during this activity. ELLs should focus on the structural difference of Yes/No and Wh-Questions. ELLs at Levels 1 and 2 may have difficulty composing their own WH-Questions, but with sentence models and teacher and peer guidance, they should be able to compose inquiry-based questions. ELLs at higher proficiency levels should be able to create complex questions with varying tiered vocabulary words, again with models and guidance from the teacher.

The third stage of the unit incorporates reflective inquiry. During this phase students investigate the essential question in relation to their selected topic. In our example lesson, we present various individuals from throughout American history to investigate (e.g., Alexander Hamilton, Susan B. Anthony, Rosa Parks, Cesar Chavez). Choosing from one of the suggested people, students research using print and online resources provided by the teacher. ELLs can use web resources and other ESL text-based resources that provide language that is scaffolded for various levels of proficiency. Students will use the information to create a microtheme. A microtheme is a type of essay completed on a single 5×8 note card. The purpose of the microtheme helps students focus on and report only the essential information found in the text. The following questions will guide students' research:

- In what ways did your subject impact other individuals, institutions, and/or society?
- What methods did your subjects use to impact individuals, institutions, and/or society?
- Do you agree with the methods your subject used? Why or why not?

Students are expected to provide evidence from both the print and online sources. The ELLs will be expected to use the targeted academic language within the microtheme. Finally, the students share their microthemes in small groups and on a voluntary basis with the whole class.

The final phase should connect the action of the individuals in the past and the present. In our example, the class brainstorms societal issues that concern them. Students work to gather background information about their selected topics. As a group, the class discusses ways in which ordinary people can support a movement to make a change (e.g., protests, letters to the editor, political cartoons, music, or letter campaigns). Students then create a multimodal artifact which requires them to use the design elements presented at the onset of the unit (e.g., a protest sign, a political cartoon, a graphic story, etc.) to support their movement.

4 Conclusion

Stories presented in graphic novel format provide an opportunity for students to learn history in a format which is more natural and easier to engage with than textbooks. Although graphic novels cannot and should not replace traditional-print texts or primary sources in the social studies classroom, for students, in particular ELLs, the graphic novel offers a format which helps to build their historical content knowledge and skills. First, the multimodal form of graphic novels scaffolds the linguistic components of the text. Moreover, the format fosters multiple literacies that require the use of metacognitive strategies to comprehend the text. These skills are part of a repertoire of skills necessary for students use to access and analyze information from a wide variety sources.

Reflective Questions

1. Could you think of a graphic novel that you could use in your current social studies curriculum? Why do you think the graphic novel would foster learning in social studies?
2. Taking an activity in your social studies classroom, could you identify the language needs of activity? How could multimodal text lessen the language demands of the activity?
3. As texts evolve, why do you believe teaching ELLs to engage with multimodal text will strengthen their social studies knowledge and skills?
4. Why would creating multimodal texts in a social studies class help ELLs better comprehend more complex sources in the future?

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Multiple Perspectives: Engaging Diverse Voices in the Social Studies Classroom

Paul J. Yoder and Ashley Taylor Jaffee

> *In a democratic and culturally diverse society, students need to comprehend multiple perspectives that emerge from within their own culture and from the vantage points of the diverse cultural groups within that society.*
>
> *National Council for the Social Studies, 2002, p. 19*

Abstract The C3 Framework and Common Core Standards place an emphasis on the role of sources in social studies instruction, creating the opportunity for teachers to engage English language learners (ELLs) through the investigation of multiple perspectives. In order to demonstrate the importance of examining multiple perspectives within social studies content, our chapter showcases two pedagogical strategies – Structured Academic Controversy and Reader's Theater – that teachers can use to make content accessible and highlight students' diverse voices. In this chapter, we draw on a framework for multicultural education, present each pedagogical strategy, and discuss how these strategies support a social studies curriculum that is culturally and linguistically responsive to the needs of ELLs.

In the National Standards for Social Studies Teachers (NCSS, 2002) and the C3 Framework (NCSS, 2013), the National Council for the Social Studies has repeatedly identified the incorporation of multiple perspectives in social studies classrooms as an important element of rich disciplinary inquiry. The Common Core State

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Standards for English Language Arts and Literacy in History/Social Studies, Science, and Technical Subjects similarly state that students must examine multiple sources in order to compare and contrast informational texts (Common Core State Standards Initiative, 2010). Recent research on social studies instruction for English language learners (ELLs) additionally suggests that analysis of multiple perspectives serves as a tool to "broaden and deepen the class discussion" (Yoder, Kibler, & van Hover, 2016, p. 31) supporting a pedagogy of making cross-cultural connections (Jaffee, 2016).

In this chapter, we present the incorporation of multiples perspectives as an approach for teaching social studies to ELLs. In any classroom, student experiences and perspectives will serve as a source of multiple perspectives. We concur with Kumashiro (2001) when he asserts that teachers in all content areas can strive to value diverse student voices, suggesting that math and science "teachers can learn where students are coming from, build from students' own cultural proficiencies, and make connections between ways students are already numerate/scientific and ways they need to be numerate/scientific to succeed in mainstream schools and society" (p. 9). In addition, we contend that teachers should incorporate multiple perspectives as a part of the content knowledge presented in social studies classrooms. For example, in a U.S. or World History classroom a teacher can engage students in examining primary and secondary sources that introduce diverse cultural, linguistic, racial, gender, or religious viewpoints on a given event or topic. In order to demonstrate the ways in which multiple perspectives can be embedded within social studies content, our chapter showcases two pedagogical strategies—Structured Academic Controversy (SAC) and Reader's Theater—that teachers can use to make content accessible and understandable, as well as highlight students' diverse voices. Our theoretical framework integrates notions of multicultural education (e.g., Banks, 2008) with a disciplinary understanding of social studies content in which the analysis of multiple perspectives is essential (e.g., NCSS, 2013), and where ELLs' perspectives of social studies content are valued (e.g., Epstein, 2009; Salinas, Franquiz, & Guberman, 2006; Yoder, 2016).

We begin the chapter with an overview of our approach to teaching social studies to ELLs, incorporating multiple perspectives in the social studies classroom. Following this section, we discuss the theoretical foundations for this approach, presenting a framework for teachers, teacher educators, graduate students, and professional development providers to consider when incorporating multiple perspectives in the social studies classroom. We then discuss how to implement this approach, presenting two pedagogical strategies, and conclude with questions for reflection. We hope this chapter provides conceptual, theoretical, and practical ideas for how to implement effective pedagogy for ELLs in the social studies classroom.

1 Approach to Teaching Social Studies to ELLs: Incorporating Multiple Perspectives in the Social Studies Classroom

The incorporation of multiple perspectives is fundamental to a disciplinary understanding of social studies education. Whether analyzing primary historical documents or considering the political viewpoints of American voters during an upcoming election cycle, the empirical study of people and society can only be considered valid and comprehensive when factoring in the various perspectives of the agents involved. As the epigraph at the beginning of our chapter suggests, social studies content is enriched when students can examine curriculum that includes both their own views and the perspectives of others (NCSS, 2002).

Addressing multiple perspectives within a social studies context can include a variety of approaches. The C3 Framework articulates "attentiveness to multiple perspectives" as a "virtue" alongside "honesty, mutual respect, and cooperation" (NCSS, 2013, p. 33). As early as second grade, students are expected to "compare their own point of view with others' perspectives" (p. 33). As the content becomes more complex, the C3 Framework defines multiple perspectives as a disciplinary tool. For example, "historical understanding requires recognizing this multiplicity of points of view in the past, which makes it important to seek out a range of sources on any historical question rather than simply use those that are easiest to find" (p. 47). The Common Core State Standards similarly identify the importance of "responding thoughtfully to diverse perspectives" and then "summarizing points of agreement or disagreement" (Common Core State Standards Initiative, 2010, p. 50). Together these examples suggest that social studies instruction can add depth to students' understanding when students encounter diverse voices in the curriculum and have opportunities to discuss their own ideas with peers.

We support Kibler and Valdés' (2016) call to interrogate the "curricularization" of knowledge when considering how to approach teaching ELLs, particularly as traditional U.S. History narratives and perspectives privilege the European American experience (Barton & Avery, 2016; VanSledright, 2008). Agarwal-Rangnath (2013) advocates teaching multiple perspectives as a powerful approach that "can help students realize that there is more than one story that can be told about any event that happens" (p. 40). For example, students may view the Civil Rights Movement through the eyes of Ruby Bridges, analyze the Chinese response to the Chinese Exclusion Act, or consider the Native American experience when studying Christopher Columbus. Thus:

> By delving deep into history, through the perspective of those outside the White narrative, we may begin to construct a vision of history that elucidates the struggles of all people for justice… In other words, by honoring and exploring multiple perspectives, we are seeing the achievement, struggles, and acts of resistance as important and integral to the collective creation of our society, country, and world. (Agarwal-Rangnath, 2013, p. 40)

In sum, incorporating multiple perspectives is an essential component of making social studies instruction culturally responsive.

In this chapter, we have selected two specific instructional approaches in order to demonstrate practical ways teachers can engage ELLs in examining multiple perspectives. The first—Structured Academic Controversy (SAC)—is built upon the goal of equipping students to "construct arguments using claims and evidence from multiple sources" (NCSS, 2013, p. 60). The second—Reader's Theater—is an activity that provides students with opportunities to consider the viewpoints of various characters, while also practicing oral language skills (Gibbons, 2016; Liten-Tejada, Seidlitz, & Short, 2011). Prior to exploring the instructional strategies presented in this chapter, we first discuss our theoretical foundations for the approach. In articulating our theoretical framework we focus on providing a rationale for why these strategies support incorporation of multicultural perspectives in the social studies classroom and how this approach supports social studies learning among ELLs.

2 Theoretical Foundations of the Approach

Our theoretical framework foregrounds the role of multiple voices. We draw on multicultural education, with a particular focus on content integration and equity pedagogy (Banks, 2008). Further, we intersect the dimension of content integration with a more focused disciplinary understanding of social studies content in which the analysis of multiple perspectives is essential (Jaffee, 2016; VanSledright, 2014; Wineburg, 2001). Lastly, we braid in the important consideration of students' perspectives of multicultural social studies content to support our approach to teaching social studies among ELLs.

2.1 Multicultural Education: Content Integration & Equity Pedagogy

Multicultural education views diversity as an asset. Diversity, according to multicultural education, includes a number of different elements: racial, ethnic, and cultural groups; linguistic backgrounds; abilities; and perspectives, just to name a few (e.g., Farr, Seloni, & Song, 2010; Nieto, 2013; Norton, 2013). A key goal of multicultural education is to "help individuals gain greater self-understanding by viewing themselves from the perspectives of other cultures" (Banks, 2008, p. 2). Further, by acquiring this perspective, multicultural education hopes to support students' gaining the knowledge, skills, and attitudes to better engage and interact with a variety of cultures (e.g., their own community culture, the mainstream culture, and within/across other racial, ethnic, and linguistic cultural groups).

In order to achieve these goals of multicultural education, Banks (2008) identifies a framework based on five dimensions: (1) content integration, (2) the knowledge construction process, (3) prejudice reduction, (4) an equity pedagogy, and (5) an empowering school culture. Banks argues that all dimensions are needed to complexify the implementation of multicultural education. Focusing on incorporating multicultural perspectives in social studies education, we choose to highlight the content integration and equity pedagogy dimensions.

Content integration involves what the teacher does to include multiple perspectives, experiences, data, information, and examples from a variety of racial, ethnic, and cultural groups in their particular disciplines. An equity pedagogy is the implementation of this content in ways that support academic achievement and engagement from diverse racial, ethnic, and cultural groups. Further, it is a pedagogy that works to reduce prejudice and support positive racial and ethnic attitudes and interactions, by using a variety of differentiated methods and incorporating multiple perspectives, in both content delivery and accessing students' lived experiences and ideas.

An equity pedagogy is responsive to students' racial, ethnic, and linguistic backgrounds, particularly in regards to learning needs and cultural assets and experiences (Banks, 2008; Ladson-Billings, 1994; Moll, Amanti, Neff, & Gonzalez, 1992). We hope the implementation of the approach we present in this chapter, incorporating multiple perspectives, supports notions of multicultural content integration and equity pedagogy. Additionally, our framework for this approach aims to intersect the multicultural education dimension of content integration with a more focused disciplinary understanding of social studies content in which the analysis of multiple perspectives is essential.

2.2 Social Studies Education and Incorporating Multiple Perspectives

Social studies scholars have asserted the importance of incorporating multiple perspectives in the social studies classroom. Some scholars have discussed this approach as it relates to developing historical thinking skills and understanding (VanSledright, 2014; Wineburg, 2001), while others have discussed the importance of including multiple perspectives in the curriculum to develop the knowledge and skills necessary for sustaining a healthy democracy (Parker, 2004) and supporting the development of an active and engaged citizenry (Banks, 2008; Westheimer & Kahne, 2004). For the purposes of this chapter, as it relates to teaching social studies to ELLs, we focus on a framework that aims to address the needs that are particular to ELLs (e.g., cultural, linguistic, and civic). The framework, culturally and linguistically relevant citizenship education (CLRCE), draws on culturally relevant pedagogy, linguistically responsive teaching, and notions of active and engaged citizenship (Jaffee, 2016) to develop five principles: (1) pedagogy of community;

(2) pedagogy of success; (3) pedagogy of making cross-cultural connections; (4) pedagogy of building a language of social studies; (5) and pedagogy of community-based, participatory citizenship. The principles that align with the approach discussed in this chapter are pedagogy of making cross-cultural connections and pedagogy of building a language of social studies.

Pedagogy of making cross-cultural connections aims to support students in making connections with historical content, one other, and the larger community. These cross-cultural connections are encouraged by supporting student-student and teacher-student relationships, engaging in communication and discussion, and building a community of learners in the classroom. Specifically, this pedagogy is enacted by emphasizing communication and interaction within and among cross-cultural and inter-cultural groups; for example, teachers can form groups that include students from heterogeneous cultural and linguistic groups. Further, this pedagogy is fostered through integrating content that connects to the human experience and ELLs' prior knowledge (see also Banks, 2008). And lastly, fostering cross-cultural connections in the classroom is supported by incorporating multiple perspectives in constructing historical content knowledge (Jaffee, 2016).

Another principle of the CLRCE framework that supports the incorporation of multiple perspectives in the social studies classroom is a pedagogy of building a language of social studies. This pedagogy emphasizes students' linguistic backgrounds, (emerging) bilingualism, and current English language proficiency as critical elements to consider when designing and implementing social studies instruction. The pedagogy of building a language of social studies highlights the importance of using bilingual practices to support students' cultural and linguistic knowledge and proficiencies. For example, bilingual practices such as translating, speaking, and interacting with peers in two or more languages while interpreting a primary or secondary historical document would support this idea (Jaffee, 2016; Salinas et al., 2006). Furthermore, this principle suggests identifying the linguistic demands of classroom tasks to support students' literacy skills development by incorporating multiple texts, content, and vocabulary focused on developing ELLs' English language proficiency.

We believe that the principles and elements of CLRCE, along with the dimensions of multicultural education discussed above, provide a theoretical foundation for incorporating multiple perspectives when teaching social studies to ELLs. In the next section, we offer two specific pedagogical methods that draw on the multiple components presented in this framework and provide some practical ways for how to incorporate multiple perspectives in the social studies classroom for ELLs.

3 Implementation of the Approach

In this section, we include a description and example of two pedagogical strategies that social studies teachers can use to incorporate multiple perspectives when teaching ELLs: Structured Academic Controversy (SAC) and Reader's Theater. These

methods draw on ELLs' knowledge and experiences (Gibbons, 2016; Harris, Halvorsen, & Aponte-Martínez, 2016) to engage with multiple perspectives in the social studies classroom. In this section we use the following format to discuss the implementation of each approach: (a) explain pedagogical strategy, (b) share resources, and (c) make connections to social studies & teaching ELLs.

3.1 The Structured Academic Controversy Strategy

Structured Academic Controversy (SAC) provides students with a highly systematized and organized way for approaching controversial issues in the social studies classroom. SAC requires that students work cooperatively in small groups in order to engage with contrasting opinions about, and perhaps ideologically conflicting approaches to, addressing a given issue. The structure of this method also supports the need for all students to be held accountable for actively participating. When engaging in a SAC, students are required to talk amongst their peers in the group, examine different sides of a controversial issue, and deliberate about how to navigate the controversy.

According to Larson & Keiper (2011) there are four steps to implementing a SAC: (1) choosing the discussion topic; (2) preparing instructional materials; (3) conducting the controversy; and (4) debriefing the SAC experience. First, the teacher selects a discussion topic based on the interest of the teacher, the content the teacher is covering, or student interests. Teachers must choose a topic or controversial issue that has two well-documented perspectives. While a given topic may be multifaceted, exactly two competing sides are needed to construct a successful SAC. Equally as important is that these two sides have enough evidence and information to present to students, and that the information is appropriate and accessible to ELLs (see examples in the resources section below). For example, one issue students might explore during a SAC would be compulsory voting: Should voting be mandatory in the United States? (Deliberating in a democracy, n.d.). It is helpful, when designing a SAC, to create a "should" based question related to the controversial issue. This opens up a space for debate and controversy, and provides an opportunity for deliberation and consensus-making at the end of the activity.

Second, the teacher prepares instructional materials that are equally distributed for each side of the issue and that include an overview of the issue, a discussion of the positions (both sides), and a summary of the key points about each position. It is useful, also, if additional citations or resources are provided for students to research more about the controversy. Resources can be offered in languages other than English, when available.

Third, at the beginning of the SAC, the teacher should introduce students to what they are doing and why they are participating in this sort of a discussion. Context-setting is incredibly important for ELLs as this provides the background information needed to approach the content and engage in the steps of the SAC. Teachers should provide enough time to describe the larger concept or controversial issue of

the SAC (e.g., compulsory voting or immigrant rights), as well as the purpose of the SAC (e.g., communication and deliberation), so students can have a foundation for the activity when beginning the lesson. It is important to note that the choice of an issue directly impacts the implementation of the SAC; therefore, considering students' communities and contexts is critically important when selecting controversial issues for discussion.

Following the introduction, students will need to do the following: (a) learn the positions, (b) present positions, (c) discuss the issue, (d) reverse perspectives, and (e) reach a decision (Larson & Keiper, 2011). Learning the positions requires students to read the background information about the issue as well as the related positions that will be presented during the SAC. Students will ideally be in groups of four as they read the background information, and then they will work with a partner to begin their preparation and presentation of their position.

Students will craft an argument, based on the reading (and additional research when applicable), and present one side of the issue to the other pair of students in their group. After the side A pair presents, students are given a chance to discuss the issue. This discussion includes the side B pair asking factual and clarifying questions, and offering a few counter-arguments, time permitting. Next, the side B pair presents, following the same format. Students then prepare and discuss the reverse perspectives and adopt the position they were arguing against originally. Presenting both sides of the issue gives students a chance to read, see, hear, and discuss the controversial issue from multiple perspectives. Lastly, the students have a chance to reach a decision by "leaving their allegiance" (Larson & Keiper, 2011, p. 220) to a certain position and consider how they individually and collectively make sense of the issue. Students can take some time to discuss their ideas, supported with evidence from the reading and discussion, and ideally reach a consensus on the question posed.

Finally, the teacher creates a space for debriefing the SAC as a whole class in order to provide closure for the activity. Not only can students talk about the issue itself, but they should also be prompted to discuss the process of deliberation and explore their understanding(s) of the multiple perspectives on the controversial issue discussed during the lesson. Furthermore, during the debriefing process, students reflect on the process of summarizing their assigned position and what it was like to present these facts to an opposing side. The communication skills are a critical component of this activity, and the debriefing of the SAC allows students to navigate how they felt about sharing ideas, particularly controversial ones, to their peers – many of whom might have different political and ideological perspectives on the issue.

3.1.1 Resources

A great resource for understanding how to implement a SAC as well as gather materials about controversial issues is a website called "Deliberating in a Democracy."[1] This resource provides the background and overview of the SAC method for teachers as well as lesson plans and materials. For example, the materials for the SAC on compulsory voting (the example mentioned above) can be found on the Deliberating in Democracy website.[2] Furthermore, what is great about this resource is they offer the lessons in both Spanish and English; therefore, teachers can have an opportunity to provide the background information and texts to students in both languages to help support the linguistic needs of ELLs in the social studies classroom.

Another resource is the Stanford History Education Group's "Reading Like a Historian" Curriculum.[3] This website provides teachers and students with lessons that incorporate the use of the SAC method dealing with controversial historical issues. For example, we suggest examining the lesson about Progressive social reformers asking the question: "What were the attitudes of Progressive social reformers towards immigrants?"[4] Lesson plans and materials are provided for teachers on this website as well. There are a number of other resources that offer ideas about how to implement a SAC, but we think these are two of the most useful resources for social studies teachers of ELLs.

3.1.2 Connection to Social Studies and Teaching ELLs

The SAC method contributes to both social studies and English language learning for ELLs by providing an opportunity for active and engaged communication amongst diverse cultural and linguistic groups; supporting a structured discussion about issues from varying perspectives; and requiring an organized use of texts, content, and vocabulary to support crafting and articulating an argument that involves a matter of controversy. Furthermore, the structured nature of the SAC method provides ELLs with the context and instructional elements (e.g., gathering factual evidence from texts, using the evidence to communicate an argument, discussing issues from varying perspectives) necessary for helping students understand the task as well as support their developing English language skills. We encourage teachers to devote class time to providing ELLs with explicit instruction on the skills necessary to access and understand the text that provides the

[1] The "Deliberating in a Democracy" resource can be found at www.deliberating.org

[2] The compulsory voting example on the "Deliberating in a Democracy" website can be found at http://www.dda.deliberating.org/index.php?option=com_content&view=article&id=73%3Avoting&catid=41%3Avoting&Itemid=37&lang=en

[3] The Stanford History Education Group, "Reading Like a Historian" Curriculum can be found at https://sheg.stanford.edu/rlh

[4] The "Progressive Social Reformers" lesson example on the Stanford History Education Group website can be found at https://sheg.stanford.edu/settlement-house-movement

background information necessary to participate in the SAC. For example, teachers can model skills like highlighting, paraphrasing, defining, translating, and discussing to help ELLs successfully implement the SAC method.

When implementing the SAC method, students actively experience examining controversial issues from multiple perspectives and engage their peers in content-based dialogue (Barton & Avery, 2016; Johnson & Johnson, 2009). In the past, our own students have reported enjoying the structured nature of the method, particularly because limits are set on how controversial issues are discussed and explored. Students often feel uncomfortable talking about issues that are highly controversial in nature (e.g., immigration rights, abortion), but have noted that the SAC method gives them a chance to talk about these issues in a way that they feel offers a safe space in presenting multiple sides of an issue.

3.2 The Reader's Theater Strategy

Reader's Theater is a strategy in which students read a script as part of a collaborative performance. Students can volunteer to read the lines of a particular character or be assigned to read a given role. Reader's Theater provides students with access to content through conversational language and different parts may have varied reading levels to accommodate student linguistic diversity. Some of our former students who were hesitant to volunteer to read from the textbook were motivated by the opportunity to perform.

Reader's Theaters that incorporate social studies content often include the perspectives of historical figures or fictional characters based in a certain time or place. When leading a Reader's Theater, teachers should provide students with time to practice their parts independently (Worthy, 2005). In cases where there are more students in a class than roles in the Reader's Theater, teachers may assign a single part to multiple students and ask them to choral read. Teachers can also strategically assign "roles to readers according to their English proficiency" (Liten-Tejada et al., 2011, p. 60). When a Reader's Theater script is not available, teachers may choose to write their own or engage students in writing a script based on student research, a shared text, or some other resource. Finally, we recommend using a debrief discussion or written reflection to help students process the Reader's Theater experience, particularly as ELLs will benefit from the opportunity to summarize and ask questions about the language and social studies content knowledge and skills learned during the activity.

3.2.1 Resources

Teachers may find Reader's Theater scripts in a variety of published sources. Worthy's (2005) *Readers Theater for Building Fluency* provides teachers with helpful strategies and scripts for using Reader's Theater in the classroom. Reader's

Theater scripts aligned specifically with social studies content are also available. Flynn's (2011) collection of scripts align primarily with U.S. history content and are described as appropriate for all ages. Other authors tailor their books to particular grade levels. For example, Schafer (1994) presents Reader's Theaters for students in middle grades based on famous Americans. Lakeshore (2010a, 2010b) similarly published U.S. history-based scripts for students in the upper elementary grades. *Junior Scholastic* also prints "plays" that can be accessed with a subscription or through an academic database (e.g., Kashner, 2014).

Teachers may also access web-based Reader's Theaters. In addition to printed collections, Rosalind Flynn also maintains a website with Reader's Theaters linked to various content areas.[5] Robertson's (n.d.) article on the Colorín colorado! website provides teachers with suggestions for how to use Reader's Theater with ELLs and links to recommended scripts. Finally, ReadWriteThink provides a series of resources teachers may adapt for use with the Reader's Theater strategy.[6]

3.2.2 Connection to Social Studies and Teaching ELLs

Liten-Tejada et al. (2011) identify Reader's Theater as a strategy that provides students with opportunities to practice oral language production, a skill that is particularly relevant when teaching ELLs (Freeman, Freeman, Soto, & Ebe, 2016; Gibbons, 2016). Liten-Tejada and colleagues also argue that Reader's Theater "reinforces content knowledge" given the "strategically written scripts that incorporate academic vocabulary" (pp. 58–59). The following excerpt from an observation in Mr. Henry's seventh grade U.S. history class demonstrates the power a Reader's Theater can have in engaging students in the perspective-taking process (see Yoder & van Hover, 2018). In this brief exchange, two ELLs—Victoria and Fareed—stay in character while deviating from their Reader's Theater script on the Holocaust:

> Mr. Henry is narrator E and reads that the main characters are "arrested" (stressing the word). There are gasps across the room and Victoria, who is reading one of the main parts, points at Fareed (who is the other main character) and says, "It's all your fault." Mr. Henry says, "They're all taking the blame themselves." Victoria (still turned and talking to Fareed) says, "We're nuts like that." (fieldnotes, 3/13/14)

This brief example provides evidence of how middle school ELLs adopted the roles of their assigned characters. The fact that Victoria could "ad lib" a few lines while staying in character illustrates that she was engrossed in the activity. Through inviting students to enter into the role of a particular character, Reader's Theater provides teachers with an important strategy for helping students consider multiple perspectives during social studies instruction while providing ELLs with the support to quite literally speak up in class.

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[5] Flynn's website can be accessed at www.rosalindflynn.com/EdThtrScripts.html

[6] The ReadWriteThink page on Reader's Theater is located at http://www.readwritethink.org/classroom-resources/lesson-plans/readers-theatre-172.html?tab=1#tabs

4 Conclusion

In this chapter, we have described conceptual, theoretical, and practical approaches to incorporating multiple perspectives in the social studies classroom. We argue that this approach supports a social studies curriculum that is culturally and linguistically responsive to the needs of ELLs; provides teachers with an approach to encourage ELLs to access and understand social studies content knowledge; and offers *all* students the opportunity to experience diverse racial, cultural, and linguistic perspectives of disciplinary content. The two pedagogical strategies discussed in this chapter, Structured Academic Controversy and Reader's Theater, provide teachers, teacher educators, graduate students, and professional development providers with practical ways for approaching the incorporation of multicultural perspectives in the social studies classroom.

We hope that (future) teachers will apply the ideas presented in this chapter as it best fits their contexts, communities, schools, and students' needs and experiences. Critical to an effective implementation of this approach is to modify the strategies presented to the current needs of *your* ELLs. Finally, we offer some reflection questions below to help you (re)consider how you incorporate multiple perspectives in your social studies classroom.

Reflection Questions

1. How do/will you integrate ELLs' voices, experiences, and perspectives in your social studies curriculum? (If applicable, identify a particular instructional strategy, unit of instruction or lesson plan for exploration.)
2. What specific social studies content do/will you teach that would most closely align with the strengths and goals of using Reader's Theater and/or Structured Academic Controversy in your classroom?
3. How do Reader's Theater and Structured Academic Controversy provide content knowledge and language skills for ELLs? (Expand upon the scholarship cited in this chapter.)
4. What other instructional methods would you consider implementing to incorporate multiple perspectives when teaching ELLs in your social studies classroom?

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