7

Disciplinary Language Development in Writing: Science Reports and Common Core State Standards

Dong-shin Shin

Introduction

T: Tell me about your writing.
St: Butterflies are beautiful.
T: I like your topic. What details are you going to be adding?
St: None, I don't know.
T: Hum. Why do you think Butterflies are beautiful?
(Pause, student does not respond)
T: Can you tell me about a time you saw one?
St: I don't know.

The dialog excerpt above is what first-grade teacher Laura Hall shared with me, her graduate advisor, as a typical interaction that she had in teacher–student conferences with English language learners (ELLs) about their writing. Ms. Hall stated that it was necessary for her to provide scaffolding for the students to transfer the background knowledge that they had built for writing during class activities into their own written texts. As a mainstream classroom teacher who does not have professional expertise in English as a second language (ESL) and bilingual education, she was not confident in supporting ELLs' literacy development in academic writing. In our meetings, she sought out pedagogical methods and strategies for addressing difficulties that ELLs had with academic language in contexts of schooling, and for unpacking domain-specific language for their content knowledge development. Like Ms. Hall, many mainstream

L. C. de Oliveira et al. (eds.), *Second Language Writing in Elementary Classrooms*

and content-area teachers face the same pedagogical challenges in teaching reading and writing grade-level texts to growing numbers of ELLs.

To support ELLs' academic success, L2 scholars have advocated providing explicit instruction on domain-specific language in content areas toward metalanguage development (de Oliveira & Schleppegrell, 2015; de Oliveira & Dodds, 2010; Gebhard & Harman, 2011; Schleppegrell, 2004). Recently, U.S. K-12 general teacher education programs that have adopted Education Teacher Performance Assessment (edTPA) also mandate that pre-service teachers possess the ability to design and implement content instruction with an analysis of domain-specific texts at the vocabulary, structure, and discourse levels (Pearson Education, 2015). This kind of pedagogy for illuminating disciplinary language is much needed in the current U.S. standards-driven educational reform era based on the Common Core State Standards (CCSS), which requires students to develop the ability to read and write complex informational texts at their grade levels from an early age. To young ELLs who are developing social language proficiencies, however, reading and writing grade-level complex texts in content areas is more challenging. Their academic language development necessitates sufficient scaffolding involving various types of supports from linguistic, sensory to social interactional supports, along with opportunities to "learn about language in the context of using language" (Gibbons, 2009, p. 64). Hence, providing the instruction that ELLs need for academic success and literacy development involves teacher's systematic efforts to transform their instruction through expanded views of language, literacy, and learning.

This chapter examines how a first-grade teacher, Ms. Hall, designed a writing curriculum drawing on systemic functional linguistics (SFL)-informed genre pedagogy, and how ELLs wrote science reports on organisms within this writing curriculum. This examination will be guided by the following research questions:

1. How does the teacher's metalanguage of genre and register features shape the teaching of science reports?
2. How do students' abilities to write science reports change in SFL-informed pedagogy?

Disciplinary literacy in science

Language patterns in science

The language of content areas is varied, with domain-specific disciplinary language features. Scientific academic discourse entails a distinctive way of knowing, thinking, and sharing ideas through various semiotic modes including oral language, written text, images, gestures, and interactions with material objects (Kress, Jewitt, Ogborn, & Tsatsarelis, 2001; Lemke, 1990). These semiotic systems convey scientific meanings in specific themes, genres, and stylistic norms (Halliday & Martin, 1993). Specifically, scientific informational texts used in schools represent canonical and theoretical scientific ideas by drawing on classifications of objects, relationships of classifications, and logical connections among general phenomena and processes in an echo system (Lee, Quinn, & Valdés, 2013; Lemke, 1990). The discourse of science texts employs authoritative and impersonal registers, and fact-based reasoning to maximize the objectiveness of the information that the text conveys. That is, facts are presented objectively without the author's opinions regarding the value of the facts. Similarly, the lexis of scientific texts is technical, abstract, dense, and metaphorical, which are different from narrative or everyday discourses. The lexico-grammatical features include general classes of nouns, present-tense verbs, nominalization, passive sentences, and technical vocabulary (Halliday, 2004; Halliday & Martin, 1993).

Academic scientific discourse is characterized by functional themes/elements such as topic presentations, descriptions of attributes, reports of characteristic events, and category comparisons and explanations (Lemke, 1990). In terms of these language functions, scientific texts used in the content area of science in school settings could be categorized into five basic writing genres: *procedures*, *procedural recount*, *explanation*, *report*, and *exposition* (Fang, Lamme, & Pringle, 2010, pp. 105–107). Even though the realization of a genre could be variable from one instance to another depending on text production situations, variations of genres in the different contexts of situations could be rendered into relatively stable language patterns over time. The patterns are distinct enough to note what constitutes each specific genre. In this, Fang and colleagues show the purpose, text structure, and grammatical features of the five school-based genres:

A procedural text records step-by-step information for enabling scientific activities to occur. It starts to state an aim for a science activity followed by the materials that are needed for the activity. Procedural steps are described in imperative or declarative sentences with action verbs and temporal conjunctions.

A procedural recount is intended to retell in order the aims, steps, results, and conclusion of a scientific activity (e.g., experiment). It records events in action-oriented events using action verbs and in declarative sentences with temporal conjunctions. A scientific recount retells scientific procedures in the past tense, but it employs a passive voice to suppress actors for objective scientific discourse.

An explanation is intended to explicate how something occurs or reasons for a phenomenon, and it focuses on explaining processes and factors for a phenomenon occurrence following a general statement of the phenomenon. For cause–effect relationships among factors, its lexico-grammatical features employ embedded clauses with logical conjunctions in passive voice. The scientific processes are described in action verbs with nominalization and technical terms.

A report realizes social purposes to describe attributes, properties, and behaviors of a single class or entity in a system of things. A report organizes information about things into taxonomies of classes and subclasses with a general statement of a thing and a description of various aspects of the thing. Its lexico-grammatical features rely on uses of linking verbs (e.g., be, have) to introduce technical information in descriptive lexis for defining, classifying, and contrasting things. The lexico-grammatical features that construe scientific reports entail "thing-focused" complex sentences drawing on the present tense, nominalization, technical terms, and embedded clauses.

An exposition is a text meant to persuade the reader to think or act in particular ways through scientific evidence and claim that results from the analysis, interpretation, and evaluation of data. An exposition is organized by a thesis statement that includes background information about the debated issue, followed by supporting or refuting evidence for the argument and reconfirmation

> of the thesis. It uses lexis that expresses values and judgments as well as comparisons and contrasts. Its argumentative thesis is often stated with logical conjunctions and nominalizations in a passive voice to seem more objective.

As such, academic scientific texts are written in an authoritative, distant, serious register (Wollman-Bonilla, 2000) that is different from the discourse of familiar, everyday language. This kind of decontextualized informational literacy is new and challenging to primary-grade children, considering that their language practices are contextualized everyday literacies connected with life experiences and social interactions with family and peers (Dyson, 2003). Moreover, culturally oriented language uses by children from non-dominant language backgrounds (e.g., English language learners) could be an issue when they are faced with using and developing academic, domain-specific language in school (Halliday & Martin, 1993; Newkirk, 1987).

The current initiative of the CCSS in U.S. K-12 schools requires that children be able to read, comprehend, and write informational, domain-specific texts by the fourth grade. It hastens the transition from contextualized everyday literacies into decontextualized academic informational literacies beginning in primary grades, even though studies show that children are engaged mainly with narratives during primary grades and have not had many experiences in informational texts (Duke, 2000). Therefore, providing early support for the development of decontextualized, domain-specific literacies is critical for children's academic success.

Scaffolding for young children's leaning scientific texts

Making abstract and esoteric domain-specific language comprehensible for children has been a concern for L2 educators, and a range of scaffolding has been introduced, from building upon prior knowledge to teaching text structures through graphic organizers to vocabulary instruction (Echevarria, Short, & Powers, 2006; Echevarria, Vgot, & Short, 2008). Among these scaffolding processes, in the following section I will review what Ms. Hall and her students drew on to negotiate meanings while writing science reports on organisms—visual images, graphic organizers, and metalanguage.

Studies have shown that visual image is a critical modality in young children's learning of scientific discourses and expressing

scientific meanings in their own texts. For example, Varelas and Pappas (2006) show how first and second graders developed scientific understandings and scientific genres of illustrated informational books. Children represented scientific ideas and meanings visually along with use of linguistic resources, and their texts realized scientific registers to construe the meanings. Specifically, a multimodal project such as creating illustrated books provided young children with a prominent way to engage in the meanings of science. Through such projects, children's ways of understanding science reflect their writing practice in which multiple modalities such as writing, talking, and drawing are intricately intertwined with each other (Dyson, 2003).

Similarly, graphic materials are widely used as another visual support for young learners to access the ideas in complex texts. Specifically, graphic organizers become comprehensible tools for students to identify relational concepts and structures of texts. In learning scientific genres, young learners can organize ideas coherently by employing discourse features of the scientific genre texts through use of figural organizations of text information and structure (Echevarria et al., 2006). Lee, Maerten-Rivera, Penfield, LeRoy, and Secada (2008) show that teachers' extensive uses of a variety of graphic materials (e.g., graphic organizers, Venn diagrams, pictures of measurement instruments, drawings of experimental setups, data tables, graphs, charts) helped English learners from grades 3 through 5 to understand scientific concepts and information by scaffolding the scientific language in informational texts.

Metalanguage is a meaningful scaffolding resource for teaching domain-specific language. For example, Palincsar and Schleppegrell (2014) show that use of metalanguage in a science lesson helped children from second- through fifth-grade ELLs to understand and write grade-level informational texts. Metalanguage, language about a language, includes terminologies and talk about language and meaning. From early elementary grades, children can engage in closely reading meanings of texts, talking about meanings that language resources construe, and writing their own texts by drawing on the language they are learning. Through the use of metalanguage, children can understand how meanings of texts are created with language resources in texts. Learners' metalanguage development entails "interaction and feedback in meaningful contexts, supported

by explicit attention to language itself" (p. 619). In a similar vein, de Oliveira and Dodds (2010) introduce how a fourth-grade teacher supported students' understanding of informal texts of planets through analysis of the language of science. They show how SFL-informed language analysis instruction, what they call "language dissection" pedagogy, allowed children to understand scientific meanings of complex informational texts.

Method

School and classroom contexts

Lincoln Elementary School, where Ms. Hall implemented this project, is located in an economically struggling city in Western New York. Lincoln is a Title One school serving students from low SES family backgrounds; 45% of its students received free lunches. Half of the students are from linguistically and culturally diverse backgrounds as noted in its demographics: 29% of the students are black, 14% Asians, and 7% Latino, while 6% were ELLs with limited English proficiency. Lincoln is well equipped with instructional technologies, with each class having access to wireless Internet, an Elmo projector, and two laptop carts for school in addition to its two computers. The school computer teacher supported classroom teachers' uses of computer programs or Internet resources. The schoolteachers had been using Glogster, an online platform for digital composition and interactive learning, to write and publish texts. Ms. Hall's first-grade class reflects the Lincoln school's demographic profile, with four bilingual students out of 17 students, and six students received free lunch.

The classroom teacher, Ms. Hall, was a first-year teacher when I conducted this study. She was new to teaching ELLs even though she had an opportunity to work with a few ELLs in her student teaching. She was particularly interested in ways to scaffold written language development, as many ELLs show higher basic interpersonal communication skills than cognitive academic language proficiency (Cummins, 1984). Her ELLs had difficulties writing about what they had learned even though they could perform oral presentations well. According to the CCSS in English language arts (ELA) and disciplinary literacy, her first graders were required to have the ability to write opinion pieces, informative/explanatory texts, and narratives, using a variety of digital tools with guidance and support from adults

(National Governors Association Center for Best Practices, Council of Chief State School Officers, 2010). These text types/genres can also be guiding standards for other content areas beyond ELA, given that the CCSS takes an interdisciplinary approach to teaching literacies across content areas.

Ms. Hall had been making efforts to provide opportunities for students to learn academic language in content areas in an authentic way that reflects her young students' age and interests. Considering that young children are challenged to read and write informal texts beyond telling stories, she wanted in particular to develop expertise in pedagogical methods for unpacking disciplinary language in the content areas and explicitly teaching how to use the language for various literacy activities that she designed for content-area instruction. To address her pedagogical interests, I apprenticed her into disciplinary language development through genre-based pedagogy that is grounded in SFL (Derewianka, 1990; Fang et al., 2010). Drawing on this language-focused instruction, she created a thematic unit on writing a report on organisms, combining ELA and science curricula in alignment with the CCSS.

Curricular unit of science report writing

The curricular unit that Ms. Hall designed was based on interdisciplinary crosscutting concepts between ELA and science. That is, the Next Generation Science Standards (NGSS Lead States, 2013) that the school adopted for the first-grade science curriculum mandates the function, structure, growth, and development of organisms in isolation and in the habitat as disciplinary core ideas, while requiring that students be able to describe similarities and differences between organisms. In terms of ELA, the CCSS (National Governors Association Center for Best Practices, Council of Chief State School Officers, 2010) requires first graders "to write informative/explanatory texts in which they name a topic, supply some facts about the topic, and provide some sense of closure" (p. 19). Drawing on interdisciplinary concepts between ELA and science, Ms. Hall designed a unit on writing science reports in which students observed, explained, and described structures and functions of organisms in pond water such as guppies, millipedes, and pill bugs. She developed the unit adopting SFL-informed genre pedagogy (Feez, 1998; Rothery, 1996) and scaffolded the language of scientific informational texts

for her students' metalanguage development for various academic literacy activities.

Students learned how to write a report on organisms in a teaching/learning cycle that the teacher developed based on work by SFL scholars who collaborated with teachers to support academic writing development of ELLs in U.S. elementary school contexts (Brisk & Zisselsberger, 2010; de Oliveira & Lan, 2014; Gebhard, Willett, Jimenez, & Piedra, 2010; Harman, 2013). The teaching/learning cycle is intended to enhance students' metalanguage through explicit instruction on available meaning-making resources in a specific context of writing and critical reflection on chosen semiotic choices. The cycle entails four stages:

Orientation. The first stage was meant for constructing a shared context for learning. To build content and genre knowledge, the class started to build backgrounds related to the topic organisms by drawing on life experiences, books, and Internet resources. To build knowledge on a genre's purpose and the context in which science reports are typically used, students discussed organisms in pond water such as guppies, millipedes, and pill bugs by reading textbooks and trade books, and watched them on the Internet. In this, students also had an opportunity to build the vocabulary that they would use in their reports on organisms. They then took a class field trip to a local park and set up a fish tank for later observations and activities.

Modeling and deconstruction. After getting oriented to the content and genre of writing a report on organisms, the students started to deconstruct genre features of reports by analyzing model texts. Noting her students used to write simplified narratives about what they do or like, Ms. Hall started with simple reports on pets, and she then introduced to the students sample science reports on organisms. With the backdrop of the context of culture in which the texts are used, she guided the students to closely read the model texts at the clause level for experiential, interpersonal, and textual meanings, and to examine employed lexical-grammatical resources for those meanings. To support students' development of metalanguage for composing texts in specific contexts of situation, she prepared an activity for working

on analyzing genre and register features of a science report, using a graphic organizer that she created after considering her students' age and language backgrounds.

Joint construction. With growing metalanguage on science reports that they developed in the previous stages, the students collaboratively co-constructed a class text about guppies, millipedes, and pill bugs. First, students discussed physical features and behaviors of these organisms that they observed in the class fish tank. The teacher guided students to transfer their discussion into the graphic organizer that she created. The graphic organizer visualized the features of the organisms and the similarities and differences among the organisms, as a way of making genre knowledge and semiotic choices visible to the students.

Independent construction. Following the joint construction stage, the students created their own graphic organizers and reports using the online platform Glogster. The school computer teacher helped the students to use the digital medium of composition and to post their finished texts, and Ms. Hall supported the students in drafting, revising, and editing their own texts. Glogster allowed the teacher to provide expanded audiences for student's text production and publication. In addition, the students had an opportunity to have access to other students' texts and compare their own text to others. This process of publishing and linking texts through Glogster was offered with the intension of encouraging student's critical reflection on and possible transformation of their textual practices.

Data collection and analysis

To examine the impact of the language-focused instruction on ELLs' writing a science report, I collected fieldnotes of class interactions, curricular materials, Glogster postings, informal interviews/conversations, and student texts. The unit of analysis that I drew on in this study was the writing texts within the context of the curricular unit of science reports. Drawing on SFL, I conducted a micro-textual analysis of genre texts, looking at textual organization, lexical and grammatical choices, and conventions regarding experiential, interpersonal, and textual meanings. Specifically, in analyzing the

data, I applied codes such as words relating to key concepts, technical terms, linking themes, logical reasoning, process/passive voice, abstract and dense nouns, and discourse structure.

Due to the scope of this chapter, even though I worked with all ELLs in the class, I will introduce an in-depth analysis of a single bilingual child's textual practices. Sara is a bilingual child who speaks Vietnamese and English. She used Vietnamese as her dominant language and spoke the language with her family members at home, and started to learn English when she started preschool. Her reading proficiency was at grade level according to the school-mandated reading test. The student enjoyed doing word work activities and writing about the things or people that she liked, but she struggled to expand stories after brainstorming ideas. She was shy about sharing her work with the class and preferred to share it with the teacher in a one-on-one setting. In terms of using the computers and Glogster, she did not show any particular difficulties.

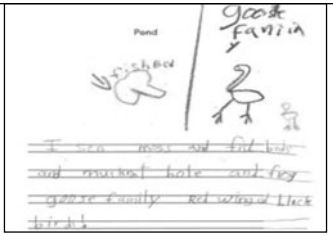
Findings

Sara's writing processes

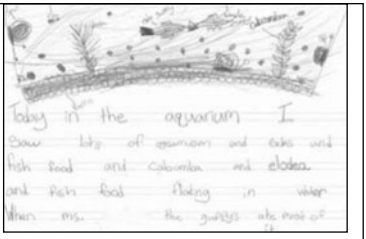
Brainstormed texts

The texts that Sara wrote over the course of the science report unit could be explained according to the four writing stages of the teaching/learning cycle. In the orientation stage, to build a shared learning context for organisms, the class went on a field trip to a park near the school and set up a class fish tank for the science report unit. Sara could observe various live animals and build content and language backgrounds through Ms. Hall' scaffolding. After the trip, Sara wrote reports on the organisms that she observed in the pond and the fish tank. Figure 7.1 shows her reports.

Both of Sara's texts below represent a discourse feature that lists the organisms that Sara observed in an everyday spoken language style, without addressing or invoking any particular audience. For example, the report written after her trip to a local pond is composed of a single sentence listing what she observed about a bird, fish beds, and a muskrat hole, with no details about the organism aside from the linking word "and." As shown in many typical emergent writers' texts, the sentence starts with a participant "I" and a behavioral



I sen moss and fish beds and muskrat hole and frog goose family red winged black bird!



Today in the aquarium I saw lots of organism and rocks and fish food and cabomba and elodea and fish food floating in water When ms. [Hall fed] the guppys ate most of it.

Figure 7.1 Texts from orientation stage

process "see," and ends with a list of nouns, rather than realizing a description of organisms starting with a nominal group participant.

While building the orientation, Sara and her class started to learn how to describe organisms through a series of explicit instructions on science reports that Ms. Hall designed. Another text that Sara composed was a report about organisms in the class fish tank. Sara's text is more focused on describing organisms with use of more technical words and nominal group participant (e.g., cabomba, elodea, guppy), even though its first sentence has the same pattern of listing what she observed in the fish tank. However, it shows more linguistic complexity with a temporal clause "when ms. [Hall fed]." Like the previous report on organisms in a pond, the text does not address or invoke any audiences. The texts from the orientation stages allowed Ms. Hall to make an informed pedagogical decision in scaffolding Sara on how to write descriptive science texts. That is, Sara needed explicit instruction on how to write thing-focused descriptive sentences with a nominal group participant and to keep focused on the key ideational meaning of the text.

Co-constructed text

After deconstructing the genre and register features of science reports, Sara worked on an activity to co-construct a report on organisms with a graphic organizer support (see Figure 7.2). The class completed the organizer collaboratively as a jointly constructed text. The organizer included discourse features of science reports in a way

My favorite organism was the pill bugs because pill bugs are very cute and small and they crawl really fast and they curl up in a ball if the pillbugs are scared which I think are adorable.	May favorite part of studying organisms was what pill bugs mostly do and I really really really want to know for sure how many legs the pill bugs have.
I found out that pill bug crawl really fast and then curl up in a ball if they pill bugs are scared and they are organisms	Did you know pill bugs may have twelve legs also they dig really fast and pill bugs don't come up for a long time.

Figure 7.2 Jointly constructed text

that was suitable to the first graders. That is, the organizer utilized spoken language features in introducing discourse features of reports with a list of prompts, such as a favorite organism, favorite parts of the organism, newly learned information, and sharing the information with readers with relevant sentence starters.

Sara completed the organizer in collaboration with the classmates and the teacher. The text in Figure 7.2 shows her improving ability to describe one single organism with details. Namely, Sara stated that pill bugs were her favorite organism and described their features with use of noun groups as participants and attitudinal lexis describing features of pill bugs (e.g., cute, small, fast, favorite) to show her feelings to readers. Following a sentence starter in the organizer that underscored reader appeals with a "speaking right to the reader" language choice (i.e., "Did you know"), Sara depicted her delight in finding pill bugs to her audience. In addition to a single topic-focused discourse, each paragraph employed a theme and rheme structure in construing textual meanings. The text was composed in a more written writing style.

My favorite organism was pill bugs because pill bugs are very cute and small. They have 12 legs. They crawl really fast and they curl up into a ball when they are scared was what pill bugs do one reason.

Figure 7.3 Independently constructed text

Independently constructed text

After collaboratively composing a report using a graphic organizer, Sara had an opportunity to compose her own report on pill bugs by using Glogster. This new digital medium provided more meaning-making resources beyond texts for Sara to write her report. To brainstorm ideas, she designed a multimodal report drawing on texts, shapes, images, fonts, and colors that represent shapes of the organisms. She then wrote her report below the multimodal text (see Figure 7.3).

The brainstorming text that Sara created reflected the graphic organizer that she generated with the class graphic organizer, but it

was written in her own words with less lexical density. Multimodal designing in a new medium allowed her to express meanings in different modes without reproducing the jointly constructed text under the teacher's guidance. Her report employs more formal discourse with nominal participants and complex clauses. She described pill bugs' features and behaviors to the end of the text. In the independent stage, Sara wrote a topic-centered report instead of a topic-associating one listing similar topics such as that shown in her first draft, a common characteristic of emergent writers. Her report described attributes of pill bugs using relational processes (e.g., are, have), content-carrying words, and logical linking words (e.g., because). At the discourse level, her report employed less situation-dependent language and more written language. This kind of hybridized language and genre is reflective of Sara's emergent literacy state.

Discussion

Findings of the study show the progress that Sara made in writing science reports on organisms within SFL-informed language-focused instruction (de Oliveira & Lan, 2014; Feez, 1998; Rothery, 1996). By looking at the ways in which she processed ideas, social purposes/audiences, and linguistic and visual features in her own texts, I was able to identify four distinct features that provide insight into how the focal child learned the genre and register of science reports for the development of metalanguage for future writing activities in this setting. First, in her science report writing, in addition to accompanying reading and discussion activities, Sara was often positioned as a disciplinary language user. In this, the child initiated listing the technical words and facts that she took from the class discussions and books. Sara produced a more detailed description of an organism beyond listing names of the organisms, after actual co-construction of the class reports with the support of the graphic organizer. This aspect of Sara's writing progress shows the importance of having an opportunity to use the language directly in learning about the language of science in supporting young children's writing development.

Second, narrating ideas or facts that look seemingly unrelated to adult readers is a typical aspect of young children's writing, as Michaels (1981) shows in her study of diverse children's narratives. She explains this writing trait of young emergent writers as a

topic-associating writing style in which children list related but different topics, as opposed to a more coherent narrative of related ideas or facts for a topic as topic-centered writing. These concepts of understanding young children's writing is also clearly relevant to understanding the focal child's writing process in this study. For example, Sara's initial reports from the orientation stage listed what she saw or did in the past tense from a trip to a pond and a class fish tank, rather than describing features and behaviors of an organism. At the end of the unit, through Ms. Hall's informed scaffolding that reflected Sara's zone of proximal development (Vygotsky, 1978), she could produce a topic-centered report on pill bugs with use of general nouns for details in the present tense, even though her report still shows a tendency to list facts rather than describe connections between facts in relation to bigger ideas/pictures. Thus, this aspect of scientific writing is a next step for Sara to work on in learning science writing for developing metalanguage for science language. This process of Sara's writing development will be a useful guide for the teacher to design scaffolding or explicit instruction for science report writing.

Dyson (2003) shows that children mix languages, language domains, semiotic modes, genres, registers, times, spaces, and topics through her studies of young children's reading and writing activities in the contexts of schooling. In fact, Sara's science report represents a nexus of science report and science explanation, spoken and written language modes, and everyday and domain-specific technical words. Given this hybrid nature of children's literacy practices, it is necessary to have a dialogic approach to teaching a rage of science genres, rather than maintaining curriculum and instruction that emphasize genre differences or genre norms by overpowering the centripetal force over the centrifugal nature of genres (Bakhtin, 1982). Keeping this dialogic approach is more critical for teaching L2 young learners the academic, domain-specific language that is different from the culturally familiar language that they fluently command in various everyday social interactions with family and peers.

Fourth, young children's understanding of audiences in writing and relationships between audiences and language choices requires careful scaffolding (Wollman-Bonilla, 2001). In particular, children tend to better grasp the interpersonal meanings that their texts construe when they have a specific addressed audience rather than an invoked one (Shin, 2014). For example, when Ms. Hall provided a

sentence starter signaling an audience to the students in the graphic organizer (e.g., "Did you know …"), the statement functioned to Sara as a signifier that she should provide some new and interesting facts rather than invoking audiences for her report. In her own report, Sara employed more attitudinal lexis to represent personal emotional characteristics of pill bugs.

Lastly, the SFL-informed teaching/learning cycle of writing stages involves jointly writing a text in the target genre, followed by independent construction of an individual text. This co-construction of a text is a required stage for supporting children's metalanguage development of academic genres and critical use of academic language. However, there are common concerns about student's reproduction of other texts on their own by copying the phrases and facts in the jointly constructed text (Gebhard, Shin, & Seger, 2011). The concern is greater when young children are positioned to learn discourses of academic disciplinary genres that are sanctioned by the authority of the school curriculum. One way of promoting children's metalanguage development of academic genres may be a change of writing medium for independent construction. In this study, Sara created her own report in a digital medium, Glogster, which allowed her to produce a more original paper with her own voice engaging in new meaning-making resources in writing.

Conclusion

This chapter has examined how SFL-informed language pedagogy shaped a first-grade teacher's writing curriculum and instruction through an analysis of an ELL's science reports on organisms. The findings show that the teacher incorporated language-focused scaffolding activities that unpack the discourse of science reports throughout the teaching/learning cycle of writing. Her language-focused instruction entailed more than providing cognitive strategies for complex informational texts or offering meaningful activities for prior background knowledge building. Within this pedagogy, the focal child wrote a topic-centered report coherently with an expanded, domain-specific linguistic repertoire, and learned to use metalanguage in understanding the language of science reports.

These findings provide a few suggestions on how to support young ELLs' writing development in the era of CCSS that requires

understanding and writing of informational texts from the primary grades. First, the teachers should be able to support children's academic language with the language resources they need for success at school. It is critical for teachers to be equipped with metalanguage as part of their pedagogical repertoire for supporting ELLs in understanding language and meaning in complex texts that are written in domain-specific ways. This meaning-focused metalanguage use in writing allows children to avoid reproducing a model genre text, and promotes critical reflection on their language use (Palincsar & Schleppegrell, 2014). It helps teachers to make informed instructional decisions by providing insight into children's processes of understanding domain-specific language and meaning. Next, ELLs' ability to produce grade-level texts and tasks is dependent on teacher's robust scaffolding for disciplinary language that involves varying group work and interactions, visual graphics, sense-making materials, collective discussions, and meaningful conversations. Third, young children's writing consists of multimodal and hybrid practices. It is often reported that even a simple illustration can allow them to better represent meanings. Similarly, children often mix writing genres and enjoy crossing boundaries for complex and rich language lives (Dyson, 2003). Teacher's design of developmentally appropriate writing tasks involves understanding this aspect of children's language use.

References

Bakhtin, M. M. (1982). *The dialogic imagination: Four essays*. Austin, TX: University of Texas Press.

Brisk, M. E., & Zisselsberger, M. (2010). "We've let them in on the secret": Using SFL theory to improve the teaching of writing to bilingual students. In T. Lucas (Ed.), *Teacher preparation for linguistically diverse classrooms: A resource for teacher educators* (pp. 111–126). New York: Taylor & Francis.

Cummins, J. (1984). *Bilingual education and special education: Issues in assessment and pedagogy*. San Diego: College Hill.

de Oliveira, L., & Dodds, K. (2010). Beyond general strategies for English language learners: Language dissection in science. *Electronic Journal of Literacy Through Science*, *9*(1), 1–14.

de Oliveira, L., & Lan, S.-W. (2014). Writing science in an upper elementary classroom: A genre-based approach to teaching English language learners. *Journal of Second Language Writing*, *25*, 23–39.

de Oliveira, L., & Schleppegrell, M. (2015). *Focus on grammar and meaning*. Oxford, United Kingdom: Oxford University Press.

Derewianka, B. (1990). *Exploring how texts work*. Rozelle, NSW: Primary English Teaching Association (PETA).

Duke, N. K. (2000). 3.6 minutes per day: The scarcity of informational texts in first grade. *Reading Research Quarterly*, *35*, 202–224.

Dyson, A. H. (2003). *The brothers and sisters learn to write*. New York: Teachers College Press.

Echevarria, J., Short, D., & Powers, K. (2006). School reform and standards-based education: An instructional model for English language learners. *Journal of Educational Research*, *99*, 195–210.

Echevarria, J., Vogt, M., & Short, D. (2008). *Making content comprehensible for English learners: The SIOP model*. New York: Pearson.Fang, Z., Lamme, L., & Pringle, R. (2010). *Language and literacy in inquiry-based science classrooms, grades 3–8*. Thousand Oaks, CA: Corwin Press and Arlington, VA: National Science Teachers Association.

Feez, S. (1998). *Text-based syllabus design*. Sydney: National Centre for English Language Teaching and Research (NCELTR).

Gebhard, M., & Harman, R. (2011). Reconsidering genre theory in K-12 schools: A response to school reform in the United States. *Journal of Second Language Writing*, *20*(1), 45–55.

Gebhard, M., Shin, D., & Seger, W. (2011). Blogging, systemic functional linguistics, and L2 academic literacies in an urban elementary school. *CALICO Journal*, *28*(2), 278–307.

Gebhard, M., Willett, J., Jimenez, J., & Piedra, A. (2010). Systemic functional linguistics, teachers' professional development and ELLs' academic literacy practices. In T. Lucas (Ed.), *Teacher preparation for linguistically diverse classrooms: A resource for teacher educators* (pp. 91–110). New York: Taylor & Francis.

Gibbons, P. (2009). *English learners, academic literacy, and thinking: Learning in the challenge zone*. Portsmouth, NH: Heinemann.

Halliday, M. A. K. (2004). *An introduction to functional grammar*. London: Edward Arnold.

Halliday, M. A. K., & Martin, J. R. (1993). *Writing science: Literacy and discursive power*. Pittsburgh, PA: University of Pittsburgh Press.

Harman, R. (2013). Literacy intertextuality in genre-based pedagogies: Building lexical cohesion in fifth-grade L2 writing. *Journal of Second Language Writing*, *22*, 125–140.

Kress, G., Jewitt, C., Ogborn, J., & Tsatsarelis, M. (2001). *Multimodal teaching and learning: The rhetorics of the science classroom*. London: Continuum.

Lee, O., Maerten-Rivera, J., Penfield, R. D., LeRoy, K., & Secada, W. G. (2008). Science achievement of English language learners in urban elementary schools: Results of a first-year professional development. *Intervention Journal of Research in Science Teaching*, *45*(1), 31–52.

Lee, O., Quinn, H., & Valdés, G. (2013). Science and language for English language learners in relation to next generation science standards and with implications for Common Core State Standards for English language arts and mathematics. *Educational Researcher*, *42*(4), 223–233.

Lemke, J. L. (1990). *Talking science: Language, learning, and values*. Norwood, NJ: Ablex.

Michaels, S. (1981). "Sharing time": Children's narrative styles and differential access to literacy. *Language in Society*, *10*(3), 423–442.

National Governors Association Center for Best Practices, Council of Chief State School Officers (2010). *Common Core State Standards for English language arts and literacy in history/social studies, science, and technical subjects*. Washington, DC.

Newkirk, T. (1987). The non-narrative writing of young children. *Research in the Teaching of English*, *21*, 121–144.

NGSS Lead States (2013). *Next generation science standards: For states, by states*. Washington, DC: National Academies Press.

Palincsar, A., & Schleppegrell, M. (2014). Focusing on language and meaning while learning with text. *TESOL Quarterly*, 116–123.

Pearson Education (2015). edTPA. Retrieved from http://www.edtpa.com

Rothery, J. (1996). Making changes: Developing an educational linguistics. In R. Hassan & G. Williams (Eds.), *Literacy in society* (pp. 86–123). London: Longman.

Schleppegrell, M. (2004). *The language of schooling: A functional linguistic perspective*. Mahwah, NJ: Lawrence Erlbaum Associates.

Shin, D. (2014). Web 2.0 tools and academic literacy development in a US urban school: A case study of a second grade English language learner. *Language and Education*, *28*(1), 68–85.

Varelas, M., & Pappas, C. C. (2006). Young children's own illustrated information books: Making sense in science through words and pictures. In R. Douglas, M. Klentschy, & K. Worth (Eds.), *Linking science and literacy in the K-8 classroom* (pp. 95–116). Arlington, VA: National Science Teachers Association Press.

Vygotsky, L. S. (1978). *Mind in society*. Cambridge, MA: Harvard University Press.

Wollman-Bonilla, J. E. (2000). Teaching science writing to first graders: Genre learning and recontextualization. *Research in the Teaching of English*, *35*, 35–65.

Wollman-Bonilla, J. E. (2001). Can first-grade writers demonstrate audience awareness? *Reading Research Quarterly*, *36*(2), 184–201.