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Writing science in an upper elementary classroom: A genre-based approach to teaching English language learners

Luciana C. de Oliveira [a,*], Shu-Wen Lan [b]

[a] Teachers College, Columbia University, United States
[b] National Pingtung University of Science and Technology, Taiwan

Abstract

This case study presents the implementation of a genre-based pedagogy informed by systemic-functional linguistics (SFL) with the goal of scaffolding the teaching of procedural recounts in the content area of science in a 4th grade classroom with several English language learners (ELLs). We use one L2 writer representative of the mainstreamed ELLs to demonstrate how the genre work impacted the focal student's writing development. This article addresses a major need in the field of second language writing: identifying instructional practices for teaching upper elementary ELLs to write school-based genres.

Keywords: Genre-based pedagogy; Elementary classrooms; Science writing; Mainstream teachers; Systemic-functional linguistics

Introduction

Ji Soo,[1] an English language learner (ELL) originally from Korea in Mrs. Darcy's fourth grade classroom, is able to speak with his classroom colleagues well and write personal stories and narratives in English language arts, but he is having difficulties in the content area of science. Specifically, he struggles to write about science experiments. The focal teacher participating in this study, Mrs. Darcy, noted Ji Soo is a ''typical'' L2 writer in her classroom: He is very focused during science instruction, is able to read the textbook with guidance from the teacher, but when it comes to science writing, he struggles. Concerned about L2 writers' struggles in science writing, the teacher asked us to pay particular attention to Ji Soo as she was interested in helping her diverse students write about science experiments.

During the upper elementary grades (Grades 4–5, ages 9–11), the content areas become more specialized. There is an increasing focus on more linguistically complex and cognitively demanding disciplinary-based written tasks and genres beyond students' familiar text types such as stories or personal narratives (Christie & Derewianka, 2008). These tasks and genres, placing new linguistic and cognitive demands on all upper elementary students, can be even more challenging for ELLs, especially in the content area of science (Carrasquillo, Kucer, & Abrams, 2004; Fang, Lamme,

* Corresponding author at: Teachers College, Columbia University, Department of Arts and Humanities, TESOL and Applied Linguistics Program, 525 West 120th Street, Box 66, New York, NY 10027, United States. Tel.: +1 212 678 7440.
E-mail address: ld2593@tc.columbia.edu (L.C. de Oliveira).

[1] All names of the focal student, teacher, school, and university are pseudonyms.

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& Pringle, 2010; Schleppegrell, 2010). In addition, little is known about best practices for writing instruction for upper elementary ELLs, and even less for science writing, the focus of this article.

Science writing has distinctive linguistic features, and knowledge of these features is important in order to understand how language constructs disciplinary knowledge in science (Fang, 2006; Halliday & Martin, 1993). Halliday and Martin (1993) discussed how science organizes and condenses knowledge and information through complex clause structures, very different from the ways meanings are constructed in students' everyday language. In order to meet the needs of scientific methods, arguments, and theories, the language of science has evolved from the language of everyday communication to contain unique scientific lexicon and grammar (Halliday & Martin, 1993). School science, as a recontextualized version of science for school purposes, still possesses characteristics of professional science discourse, such as informational density, technicality, abstraction, and authoritativeness (Fang & Schleppegrell, 2008).

In her study of science discourse and language demands for ELLs, de Oliveira (2010) has established that science uses language in unique ways, following the work by Fang (2006), Fang et al. (2010), and Fang and Schleppegrell (2008). Through an analysis of a corpus of school science texts, de Oliveira (2010) identified language demands that occur in the reading students do and the writing they are expected to produce in science: (1) Technical terms and their definitions: Technical terms occur throughout science writing and some are in bold and defined, but some technical terms may appear without a definition or definitions may be difficult to find while the definition itself may contain complex language; (2) Connectors with specific roles: Connectors (e.g., *or*) may have specific roles in science and all roles may occur within a few paragraphs; (3) Everyday questions and words with specialized meanings: Everyday questions may occur at the beginning of paragraphs with highly technical language following. Words with specialized meanings in science can occur throughout and be confusing as their everyday meaning is different from their specialized meaning in science; (4) Noun groups and their zigzag structuring: Several noun group structures appear in science—head only, pronouns, noun with pre-modifiers, noun with post-modifiers, and noun with pre- and post-modifiers. Nouns are introduced and referenced throughout a passage and their zigzag structuring may be complex to follow. Zigzag structuring involves the introduction of a nominal group in one sentence and then the tracking of these nominal groups in other sentences, creating a zigzag movement. Lexical content is accumulated in complex and expanded noun groups, creating high lexical density. These language demands in science were the main patterns found in the corpus.

These discipline-specific ways of presenting and organizing information in science construct scientific disciplinary knowledge. Students need experience with the authentic language of science so they can learn to communicate their knowledge and understanding of the natural and social worlds. Writing school-based genres in science with a focus on the language of school science constitutes an essential part of such an experience. In a study of the current practices of teaching science writing to 3rd-grade students, Lee, Maerten-Rivera, Penfield, LeRoy, and Secada (2008) highlight the need for teacher education programs to better prepare teachers to teach writing to elementary students, including ELLs. To learn to produce effective written science texts expected at school, students need to become familiar with school science genres (Schulze & Ramirez, 2007; Tower, 2005).

Enabling upper elementary students to become successful writers in science is complex and places new demands on teachers who are called to provide specific kinds of instructional support (Fang & Schleppegrell, 2008). Recognizing the particular challenges upper elementary students and their teachers might encounter in learning and teaching writing, recent work has called for educators to apply the concept of genre to writing instruction (e.g., Gebhard & Harman, 2011; Hyland, 2003, 2007; Reppen, 1994; Tardy, 2006) to support L2 writers in mainstream content area classrooms. Among the various approaches to teaching genres, genre-based pedagogy informed by systemic-functional linguistics (SFL), known as the ''Sydney School,'' has been used in elementary and secondary schools and in immigration education programs in Australia to support ELLs in writing the types of texts they will encounter within various disciplines in schools (Christie & Derewianka, 2008; Martin & Rose, 2005). Such genre-based pedagogy has also been implemented in U.S. K-12 schools in content area writing (e.g., de Oliveira & Iddings, 2014; Harman, 2013; Schleppegrell, 1998; Schleppegrell & de Oliveira, 2006). An increasing number of studies draw on SFL and combine an analysis of students' written texts with teacher interview and classroom observation data (e.g., Brisk, Hodgson-Drysdale, & O'Connor, 2011; Brisk & Zisselsberger, 2010; Gebhard, Willett, Jimenez, & Piedra, 2010; Schleppegrell, 2010; Schulze, 2011).

Among the various genres in science, *procedures*, *procedural recounts*, *explanations*, *reports*, and *expositions* are the most recognizable school science genres (Veel, 1997). Of these five school science genres, procedural recount has