

CONTENT AND LANGUAGE INTEGRATED INSTRUCTION: SUPPORTING IMMIGRANT STUDENTS IN MAINSTREAM SCIENCE CLASSROOMS

APRENDIZAJE INTEGRADO DE CONTENIDOS Y LENGUAS EXTRANJERAS: APOYAR A LOS ESTUDIANTES INMIGRANTES EN LAS AULAS ORDINARIAS DE CIENCIAS

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1. Introduction

Classrooms across Canada include an increasing number of English language learners (ELLs) whose academic achievement largely depends on an effective and integrated approach to the instruction of English and academic subjects in the classrooms. In Canada, students are placed in age-appropriate grade levels regardless of their level of English proficiency and thus spend significant portions of the day in mainstream classrooms. However, much of the work in supporting ELLs in content area instruction has focused on “tips and strategies” that teachers should use in their classrooms. Moreover, research has primarily concentrated on elementary students and fewer resources are available for students at the secondary level, especially in subject-matter classrooms such as math and science. Instruction that combines content and language

teaching is recommended for ELLs in content area classrooms (e.g., Crandall, 1992; Early, Thew, & Wakefield, 1986). However, little is known about the subject-specific language (vocabulary and expressions) of content subjects such as science. Without an understanding of the unique language of each subject, it is not feasible for teachers to integrate content and language to enhance their instruction. The purpose of this study is to address this gap.

2. Theoretical Framework

Cummins (1979; 2000) differentiates between conversational or Basic Interpersonal Communication Skills (BICS), and academic language or Cognitive Academic Language Proficiency (CALP). While students learn enough of the conversational language to interact in social contexts in less than two years, they usually require five years to learn academic language (Cummins, 2000; Garcia, 2000; Klesmer, 1994; Thomas & Collier, 2002). Explicit teaching of the language in academic contexts is crucial for the academic success of ELLs (Cummins, 2000).

A considerable body of knowledge is devoted to the kinds of language that create difficulty for ELLs (e.g., Coelho, 2007; Crandall, Dale, Rhodes & Spanos, 1990). There is also considerable research highlighting the significance and success of teaching and learning languages through content (Dalton-Puffer, 2011; Lazaruk, 2007; Lyster, 2008). Students develop high levels of second language proficiency by studying language in content-based classrooms (Lyster, 2007; Swain, 1996). These programs are most successful when academic achievement and language learning are granted equal importance and status in terms of educational objectives (Lyster, 2007). In spite of Canada being a leader in research on content-based instruction especially with regard to French Immersion programs (e.g., Swain, 1997, 2000) the integration of immigrant students in the educational system has not benefitted from such research and practice.

There is a strong correlation between vocabulary knowledge and academic performance (Alderson, 2007; Nation, 2001; Nation & Webb, 2011). By knowing more words, students comprehend texts better, and increased reading comprehension enhances their academic performance (Coelho, 2004, 2009). Many scholars have recognized the challenge that students, regardless of their language background, have

with scientific vocabulary (Carrier, 2005; Elliot, 2010; Watson, 2004). Also, knowledge of multi-word expressions referred to as clusters or lexical bundles (Biber et. al, 1999; Hyland, 2008) is highlighted as an important aspect of language proficiency. Lexical bundles occur in discourse more frequently than expected by chance, are central to academic discourse and show significant variation across disciplines (Biber, 2006; Biber, Conrad & Cortes, 2004; Hyland, 2008). Experts acknowledge that each subject area has a unique vocabulary (and multi-word expressions) that is different from other disciplines and hence is a problem for ELLs when learning the language and content (e.g., Carrier, 2005; Hanes, 2004; Hyland & Tse, 2009; McDonough & Cho, 2009; Viadero, 1995). In order for teachers to be able to provide content and language integrated learning opportunities, the specific language and discourse of each subject-matter needs to be identified.

3. Objectives or questions

In an effort to assist teachers to better respond to the linguistic and academic needs of the diverse student population in public schools, this study focuses on identifying the domain-specific language (vocabulary and expressions) of science textbooks. The outcomes of the study will provide the basis for supporting ELLs' learning of content and language simultaneously, thereby increasing their academic success.

4. Methodology

Corpus-based analysis is best suited to the identification of the specific vocabulary and expressions in each subject matter. A corpus is a large and structured collection of texts that represents the language used in a particular domain (Biber, Johansson, Leech, Conrad & Finegan, 1999). The content of the five most commonly used textbooks used for Grades 9 and 10 recommended by the Ontario Ministry of Education was used for corpus analysis. In addition to individual vocabulary, the corpus analysis focused on multi-word units (two-, three-, four- and five-word bundles). The most frequent words identified through corpus analysis were analyzed and coded to identify the subject-specific vocabulary of each discipline. The analysis focused on whether the specific

word has a discipline-specific meaning. Meanings of words were checked through www.dictionary.com and other subject-specific resources such as <http://www.science-dictionary.com/>. Bundles were analyzed and classified functionally, according to their specific meaning in texts. The study focuses on Grades 9 and 10 because these grades are very important for success in secondary school. Software tools such as Wordsmith and AntConc were used.

5. Results

Data analysis is in progress. The nature and frequency of scientific vocabulary in one textbook has been analyzed. Findings revealed that almost 15% of the lexicon from the total corpora was scientific (Vidwans, 2011).

6. Conclusion

The findings of this study are extremely useful to subject-matter teachers and the education of immigrant students. Teachers and specifically content area teachers are ill-equipped to address the linguistic challenges of multilingual classrooms. In subject matter classrooms teachers are often only “content specialists” not “language specialists”. The creation of subject-specific vocabulary and expressions can provide pedagogical support for teachers who are committed to prepare their students to handle the scientific discourse of each content area, thereby enhancing the academic achievement of all students, particularly ELLs.

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