

The SIOP Model: A Professional Development Framework for a Comprehensive School-Wide Intervention

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Educators are concerned about the academic attainment of English language learners in U.S. schools as their numbers continue to grow and their performance lags behind English-speaking peers. For teachers of English language learners, it can be challenging to teach rigorous, standards-based content to these students at the same time they are developing English language proficiency. In search of approaches to improve teaching and learning in middle schools, CREATE researchers tested several research interventions in science, social studies, and language arts classrooms with English language learners from the 2005-2006 school year to 2008-2009. In 2009, they decided to apply their combined research findings to the development of a school-wide intervention and test this more comprehensive approach in Grade 7 classrooms. In this brief, we explain how a common professional development framework, the SIOP (Sheltered Instruction Observation Protocol) Model, was used to unite the separate research studies to create the school-wide, comprehensive intervention in an effort to support English language learners across the core content areas.

The SIOP Model

The SIOP Model, an approach for integrating language development with content teaching, provides teachers with guidance for planning and delivering effective lessons. It was developed through a federally funded research project. Subsequently, it has been validated as a model of instruction that improves the achievement of students whose teachers use the model (Echevarría, Richards-Tutor, Chinn, & Ratleff, 2011; Echevarría, Short, & Powers, 2006; Short, Fidelman, & Louguit, in

press). It has been tested in multiple content areas and across all grade levels.

The SIOP Model is made up of eight components, each of which is supported by empirical studies, and the model itself has a growing research base (Short, Echevarría, & Richards-Tutor, 2011). The SIOP Model's 8 components and 30 features provide the framework for planning integrated language and content lessons, and the model can be used as a valid observation instrument as well (Echevarría, Vogt, & Short, 2008, 2010; Guarino et al., 2001). The eight components are

1. Lesson Preparation
2. Building Background
3. Comprehensible Input
4. Strategies
5. Interaction
6. Practice & Application
7. Lesson Delivery
8. Review & Assessment

To illustrate, the features of the Building Background component are shown in Figure 1. When the SIOP protocol is used as an observation tool, each feature of the SIOP Model has a range of possible scores to indicate the level of implementation in a lesson. A score of 4 indicates best practice.

CREATE's Content Area Studies

Some background on each intervention developed and tested in CREATE's early years is useful for understanding the process by which the school-wide intervention was generated. (See Additional Resources From Create

Building Background

4	3	2	1	0	NA
<p>7. Concepts explicitly linked to students' background experiences</p> <p><i>Comments:</i></p>		<p>Concepts loosely linked to students' background experiences</p>		<p>Concepts not explicitly linked to students' background experiences</p>	
<p>8. Links explicitly made between past learning and new concepts</p> <p><i>Comments:</i></p>		<p>Few links made between past learning and new concepts</p>		<p>No links made between past learning and new concepts</p>	
<p>9. Key vocabulary emphasized (e.g., introduced, written, repeated, and highlighted for students to see)</p> <p><i>Comments:</i></p>		<p>Key vocabulary introduced, but not emphasized</p>		<p>Key vocabulary not introduced or emphasized</p>	

Figure 1. SIOP Building Background component and features.

for more information on these studies, which involved science, social studies, and English language arts classrooms.)

The SIOP Model Science Study

The SIOP Model was the focus of one CREATE science study. As part of this study, researchers and teacher consultants developed units comprised of SIOP lessons designed to make the science topics comprehensible to English language learners through various instructional techniques and also to develop their academic science language and literacy skills. Each of the SIOP lesson plans included the following elements: associated state science standard, lesson topic, content and language objectives, motivation/background building, presentation of new information and key vocabulary, practice and application activities, review, and informal assessment. Researchers also developed science language assessments for each unit.

One goal of this study was to determine whether giving teachers these science units, in conjunction with SIOP professional development (workshops and coaching), could jump start their implementation of the model and help them reach higher levels of fidelity. The second goal of the study was to have a positive impact on the performance of all students in the classes, such as English language learners, former English learners, and native English speakers. To test these goals in 2006-2007, middle schools were assigned to treatment

(five schools) or control (three schools) conditions, and Grade 7 was selected for study. The treatment teachers received professional development on the SIOP Model over the course of one semester, and they taught four SIOP science units: Cell Structure and Function, Photosynthesis and Respiration, Cell Division, and Genetics. Coaches observed instruction and gave teachers feedback several times each month. Control teachers taught these same four units using the same textbook but with their own lesson plans and teaching methods. They received no coaching. Both sets of teachers were observed and their lessons were rated using the SIOP protocol. Results showed that students in the treatment classes outperformed control students (Echevarría, Richards-Tutor, Canges, & Francis, in press) and the higher the level of SIOP implementation, the better the students performed on assessments (Echevarría et al., 2011).

Quality English and Science Teaching (QuEST)

Another early CREATE intervention also focused on science. It too was designed to develop the science knowledge and academic language of English language learners and their English-proficient classmates. Researchers and teacher consultants developed 10 to 12 weeks of lessons and instructional materials based on the district curricular units and learning objectives. The approach followed the Five-E model (Bybee et al., 2006) with learning activities designed to engage, explore, explain, extend, and evaluate. The curriculum also called for

direct instruction of general academic and discipline-specific vocabulary using interactive vocabulary cards, activities, and glossaries. Teachers were shown how to scaffold learning by using visuals and illustrations, graphic organizers, models of experiments, multimedia resources, and other techniques to ensure comprehension. Teachers were also shown how to engage students in rich, text-based discussions.

The intervention was implemented in 10 sixth-grade science classrooms in five middle schools. QuEST teachers were randomly assigned to teach two science classes using the district's standard science curriculum and two science classes using the QuEST materials and strategies. Results showed that the QuEST lessons and materials improved students' knowledge of science concepts and vocabulary (August, Branum-Martin, Cardenas-Hagan, & Francis, 2009).

Adaptations of Peer-Assisted Learning for English Language Learners in Social Studies

Designed to improve students' understanding of social studies content and expository text, this intervention provided all students with opportunities to learn and use the vocabulary, concepts, big ideas, and issues associated with Grade 7 social studies units. Lessons were organized around instructional routines that included the following: presentation of content and language objectives, brief overview of a "big idea," explicit vocabulary instruction, use of a 2- to 4-minute video clip and purposeful discussion to build conceptual knowledge, assigned reading followed by students generating and answering questions, and a wrap-up writing activity or graphic organizer to review and assess learning. Much of the vocabulary and reading comprehension work was carried out by structured paired groupings of students. To design the pairings, teachers ranked the English language learners and native English speakers separately by reading and language levels and then paired the highest ranked English language learner with the highest ranked native English speaker, the next highest English language learner with the next highest native speaker, and so forth.

Four teachers in two schools participated in the study as treatment or control classrooms. The treatment teachers implemented the lessons for about 12 weeks and the control teachers covered the same curriculum topics, using their typical instruction. The findings showed that this intervention facilitated learning of academic vocabulary and content information found in expository text for all students (Vaughn et al., 2009).

Adapting Texts to English Language Learners' Needs

Another of the CREATE projects modified an interdisciplinary, middle school academic vocabulary program known as Word Generation (see <http://wordgeneration.org/proven.html> for more on this study) to focus on English language learners (Snow, 2010). Word Generation uses engaging paragraphs on contemporary issues to present crucial, all-purpose academic words and provides activities to help students learn them. Students were introduced to five general academic words each week in the context of researcher-developed introductory texts. Each of these texts introduced a dilemma and provided information from which one could argue the pros and cons of the issue. Students took positions about the issue presented in the reading and argued their own positions, necessarily using the academic words in the process. They wrote a "taking a stand" paragraph each week using arguments developed over the course of the week's readings and discussions. For CREATE, the reading and discussion activities were supplemented with word study activities designed specifically for English language learners, focusing on morphological analysis, cognate use, and etymology.

All of the teachers and students in five treatment schools carried out the intervention. Pre- and post-testing on knowledge of the vocabulary words and on essay-writing ability was carried out in the treatment schools and in matched comparison schools. Findings showed that the intervention, with its focus on cross-curricular vocabulary, promoted academic language development, and treatment students performed better on the assessments than did those in the control schools. These findings replicate earlier reported positive effects of the program for language minority students (Snow, Lawrence, & White, 2009).

Designing a School-Wide Intervention

As findings from the individual studies emerged, the CREATE researchers considered ways to design an intervention that could be implemented school-wide. They decided that the SIOP Model would be the unifying professional development framework because of its applicability across content areas and its established research base. Multiple studies have called attention to the need for sustained, job-embedded, and research-based professional development if comprehensive school reform is to become a reality (Darling-Hammond & Richardson, 2009; Wei, Darling-Hammond, Andree, Richardson, & Orphanos, 2009). By improving teach-

ing, CREATE researchers believed they could improve student performance. This could be done, in part, by teaching teachers to use effective strategies and techniques. Therefore, the promising practices developed and tested in the individual CREATE studies would be infused in the subject area interventions and in the SIOP professional development as appropriate.

The CREATE researchers also decided to bring mathematics into the mix to ensure a full complement of core content areas: science, social studies, language arts, and math. However, the math teachers would not use a curriculum intervention; rather, their only intervention would be the SIOP professional development. This distinction adds a new dimension to the research analyses (curriculum vs. no curriculum) that will be conducted in the next year.

In order to create the school-wide intervention, the CREATE team decided on the successful elements from each of the previous individual interventions that were implemented in CREATE's earlier years and incorporated them into each subject area of the school-wide intervention. First, as in the SIOP Model Science and the QuEST studies, the intervention lessons would include content and language objectives, and teachers would teach both general academic and content-specific vocabulary words. Second, based on the implementation of the study examining peer-assisted learning in social studies, features such as use of short video clips to build background and structured pair work would be incorporated in the lessons to suit the learning goals. Third, as in the Word Generation study, the subject area interventions would add more writing activities. Finally, as in all the CREATE studies, an emphasis was placed on enhanced oral interaction.

To facilitate these modifications, the SIOP Model lesson template would be used as a structure for lesson planning, with appropriate adjustments for the content areas. The curricula would be written for 10 to 12 weeks of instruction. In most cases, teachers would introduce new material on 4 days of each week and use the 5th day for reteaching and extension. The modified Word Generation lessons would be used for 20 minutes in the language arts classes; the other subject lessons would complete the period of instruction. Math treatment teachers would not receive curriculum units, but would receive support from instructional coaches for lesson planning and delivery.

The SIOP professional development would demonstrate techniques from the individual subject interven-

tions and show their applications to other content areas. The professional development sessions would be coordinated so that teachers received training in the SIOP Model and had one quarter to begin implementation with coaching before they would receive training by subject area on their specific curriculum intervention.

Implementing the School-Wide Intervention

Ten middle schools participated in the school-wide intervention during the 2009-2010 school year and were randomly assigned to treatment or control conditions. Teachers in Grade 7 were selected as the research participants. Prior to the beginning of the 2009-2010 school year, math, social studies, science, and English language arts teachers in the treatment condition participated in a 3-day workshop in the SIOP Model so that they had an understanding of the instructional needs of English language learners as well as the overarching framework for the study.

Support for implementing the SIOP Model and curricular interventions was provided by instructional support specialists (ISS) who were highly qualified coaches. The ISS team, led by researchers at the University of Texas, Austin, participated in the professional development sessions to become more familiar with each of the interventions and deepen the team members' knowledge of the SIOP Model. The ISS team then worked directly with the teachers, regularly observing instruction in their classrooms and providing feedback. In some cases, particularly with the math teachers, they also helped with lesson planning.

The control teachers in each study delivered regular instruction without curriculum units or SIOP training. Their instruction was observed for research purposes but they did not receive feedback. In the 2010-2011 school year, teachers in three of the control schools became treatment teachers and received the professional development and curriculum interventions as well. A new treatment school joined the study that year, too.

Data were collected in the treatment and control sites during the 2009-2010 and 2010-2011 school years. Teacher implementation levels were measured with the SIOP protocol and other tools to determine their fidelity to the interventions. Student performance was measured with standardized tests and curriculum-based assessments. At present, analyses are being conducted to determine whether this school-wide intervention improved outcomes for English language learners in content knowledge and academic English.

Conclusion

The intention of the CREATE program of research is to improve the school performance of English language learners. By integrating efforts to support English language learning into content area lessons across the curriculum, the whole-school intervention described here presents a coherent approach to teaching and learning. No teacher is off the hook when it comes to engaging English language learners instructionally; similarly, no student can hide from learning activities that are interactive in nature. Data analyses will reveal how well the CREATE effort has met its goal.

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Additional Resources From CREATE

- *Effective Social Studies Instruction to Promote the Knowledge Acquisition and Vocabulary Learning of English Language Learners in the Middle Grades*
By Colleen Klein Reutebuch (December 2010)
- *Improving Reading Across Subject Areas With Word Generation*
By Joshua F. Lawrence, Claire White, and Catherine E. Snow (September 2011)
- *Improving Science and Vocabulary Learning of English Language Learners*
By Diane August, Lauren Artzi, and Julie Mazrum (August 2010)
- *Using the SIOP Model to Improve Middle School Science Instruction*
By Jennifer Himmel, Deborah Short, Catherine Richards, and Jana Echevarria (May 2009)



CREATE, the Center for Research on the Educational Achievement and Teaching of English Language Learners, is conducting a program of research designed to address the critical challenge of improving educational outcomes for English language learners in the middle grades by

- Enhancing the empirical research base for readers in Grades 4–8
- Using both narrative and expository text to develop and test effective interventions that promote content knowledge and language and literacy development
- Investigating the features of instruction and text modifications that facilitate learning for English learners (e.g., traditional instruction vs. ESL-enhanced instruction, teacher-guided instruction vs. group work, traditional text vs. modified text)
- Designing, testing, and delivering professional development that ensures that teachers implement effective classroom practices to help English learners achieve high standards

For more information, visit the CREATE website

www.cal.org/create

The Center for Research on the Educational Achievement and Teaching of English Language Learners (CREATE) conducts a program of research designed to address specific challenges in the education of English language learners in Grades 4-8. CREATE is a partnership of researchers from six institutions:

- Texas Institute for Measurement, Evaluation, and Statistics, University of Houston
- Harvard University
- California State University, Long Beach
- University of California-Berkeley
- Center for Applied Linguistics
- Vaughn Gross Center, University of Texas at Austin

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