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Did They Get It? The Role of Fidelity in Teaching English Learners

Improving content literacy among language learners can depend on the extent to which teachers adhere to proven instructional models.

Jana Echevarria | Catherine Richards-Tutor | Vivan P. Chinn | Paige Ann Ratleff

Literacy instruction for English learners (ELs) is a topic of critical importance because these students are not only the fastest growing segment of the population in U.S. schools (National Center for Education Statistics, 2009), they are also overrepresented in the group of students who struggle academically (McCardle, Mele-McCarthy, Cutting, Leos, & D'Emilio, 2005; Snow & Biancarosa, 2003). The "literacy crisis" for adolescent ELs is significant because of their alarmingly poor performance on indicators of literacy such as the National Assessment for Educational Progress (NAEP; Short & Fitzsimmons, 2007). Only 3% of eighth-grade ELs scored at the proficient or advanced levels on the reading portion of the 2009 NAEP compared with 34% of non-ELs (National Center for Education Statistics, 2009). Further, while they are still learning English, these students are required to take district and state high-stakes assessments that may have considerable consequences, especially at the secondary level. At least half of U.S. states use a high school exit exam as a criterion for a high school diploma (Short & Fitzsimmons, 2007).

A contributing factor to the poor performance of ELs is the role of academic language in literacy and learning. Academic language is used by all students in school settings—those whose home language is English and ELs alike. However, this type of language use is particularly challenging for ELs, who are still acquiring English at the same time that school tasks require a high level of English usage.

Participation in informal conversation demands less from an individual than joining in an academic discussion (Cummins, 2000). Many ELs have the ability to converse in English without needing a strong repertoire of academic language skills. They may appear to speak English well, for example, in hallways and in small talk before class begins but struggle to use English well in classroom lessons when a higher language level is required for academic processes, such as in summarizing information, reading and understanding expository prose, evaluating perspectives, and drawing conclusions.

So, how do we assist ELs through the process of learning standards-based concepts, skills, and information in a new language? How do we effectively

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accelerate their acquisition of academic English?

Findings from the National Reading Panel (National Institute of Child Health and Human Development, 2000) and the National Literacy Panel on English Language Learners (August & Shanahan, 2006) as well as subsequent studies have provided the field with research-based strategies and approaches proven effective with ELs (California Department of Education, 2010; Cloud, Genesee, & Hamayan, 2009; Echevarria, Vogt, & Short, 2010; Genesee, Lindholm-Leary, Saunders, & Christian, 2006; Goldenberg, 2008; Haager, Klingner, & Vaughn, 2007; Richards & Leafstedt, 2009; Shatz & Wilkinson, 2010).

However, research-based practices are only as good as their implementation in terms of effect on student achievement. One element that is often missing in the discussion of research-based literacy practices is the relation between teacher implementation and student achievement. Even when research shows that a practice leads to achievement gains, how well are teachers using it in the classroom? On balance, there is much more discussion about which specific practices are research based and perhaps not enough about the fidelity with which the practices were implemented.

This article demonstrates the importance of implementing research-based literacy practices with fidelity to have a positive effect on student achievement. We present results of a study that show the direct relation between teacher implementation of research-based practices and student achievement.

The Importance of Fidelity

In education research, *fidelity* is defined as the degree to which an intervention or model of instruction is implemented as it was originally designed to be implemented (Gresham, MacMillan, Beebe-Frankenberger, & Bocian, 2000). Many research studies do not assess or report fidelity (Cordray & Jacobs, 2007; Dane & Schneider, 1998; Gresham et al., 2000), and therefore we are often left uncertain as to the actual effect the intervention had on student achievement. In studies that do assess and report fidelity, the importance of implementing with close correspondence to the original validated model (i.e., with fidelity) is underscored.

In one such study, results indicated that when teachers adhered to the instructional program with fidelity, student achievement—including that of ELs—improved. When student achievement waned, the researchers found through a review of project data and videotaped lessons that students were receiving a weak version of the original program (Allen, 2007). The same held true for a model of school change that had been successful in a school with large numbers of ELs for a number of years (Goldenberg, 2004). The goal of this school reform model was "helping students who tend not to do very well in our schools read and write at higher levels" (p. 4). Although they did achieve their goal, as time went on there was less attention paid to the process that led to change. Competing district initiatives, among other factors, reduced the level of fidelity to the original model, and fewer teachers participated. One teacher's poignant comment emphasizes the need for maintaining high levels of implementation:

> You know, when I get students from the teachers that have been involved with it I can see the difference in them versus the ones from new teachers that haven't had the exposure. And believe me, there is a distinct difference. (Goldenberg, 2004, p. 165)

Fidelity and High-Quality Professional Development

The connection between fidelity and high-quality professional development is depicted in Figure 1. Ongoing teacher support increases adherence to the practices being learned and implemented, which is critical because fidelity has been linked to improved outcomes (Allen, 2007; Echevarria, Short, & Vogt, 2008; Emshoff et al., 1987; Goldenberg, 2004; Holbach & Rich, 2004; Moran, 2007; Tomlinson, Brimijoin, & Narvaez, 2008).

Optimal professional development in schools is the goal, but it may not always be feasible for a variety of reasons including limited resources, lack of leadership, low expectations for improved outcomes, externally imposed initiatives that consume time, and the like. Whatever the realities in schools, it is clear

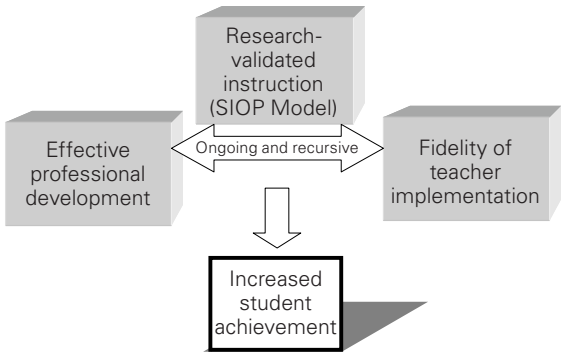
that improvement of teacher literary practice is enhanced with sustained, ongoing professional development. The new paradigm encourages continuous, collaborative professional development as opposed to the previous model of professional development in isolation—such as one-day workshops (Gallimore, Ermeling, Saunders, & Goldenberg, 2009; Smith, Wilson, & Corbett, 2009; Wei, Darling-Hammond, Andree, Richardson, & Orphanos, 2009).

Darling-Hammond and Richardson (2009) summarized two decades of research supporting the kind of professional development that has the following features: (1) deepens teachers' knowledge of content and how to teach it to students, (2) helps teachers understand how students learn specific content, (3) provides opportunities for active, hands-on learning, (4) enables teachers to acquire new knowledge, apply it, and reflect on the results with colleagues, (5) links curriculum, assessment and standards to professional learning, (6) is collaborative and collegial, and (7) is intensive and sustained over time.

These findings were borne out in our own case study research, in which we investigated the professional development efforts of 17 different sites across the United States that implemented the Sheltered Instruction Observation Protocol (SIOP) Model to a high degree in settings with ELs (Echevarria, Vogt, & Short, 2008, 2010). The data from interviews and observations highlight the following factors for success in ensuring fidelity of implementation:

- Multiple opportunities for teachers and administrators to learn about and see demonstrations of each component in the model (e.g., analysis of videotaped lessons and discussion of readings)
- Lesson plans incorporating the target component and teacher practice of each new feature of the component with a peer coach
- Some form of professional learning community for teachers to co-plan lessons, observe lessons, discuss student data, and support one another in meeting students' learning needs (learning communities flourished in situations where time to meet was made a priority)
- A single focus for a sustained period of time (i.e., the whole district committed to SIOP training and implementation for two years) rather than having competing initiatives
- A supportive culture in which teachers and school leadership value continuous professional learning and shared leadership (Saunders, Goldenberg, & Gallimore, 2009; Smith et al., 2009)

Figure 1 The Relation Between Implementation and Student Achievement



In sum, research shows that student achievement improves when teachers are "engaged in sustained, collaborative professional development that specifically focused on deepening teachers' content knowledge and instructional practices" (Wei et al., 2009, p. 5).

CREATE Research Study

The present study, funded through the Center for Research on the Educational Achievement and Teaching of English Language Learners (CREATE), extends previous work by examining the specific effect teacher implementation levels (i.e., fidelity) have on student performance. The context of the study was to test the effects of a model of instruction for ELs, the SIOP Model, on their content area literacy and language development in science. Because NCLB testing includes science, ELs' ability to read, write, and discuss scientific concepts is more critical than ever.

Methods and Procedures

We investigated the effects of specialized instruction on students' growth in content area literacy in seventh-grade science classes. Eight middle schools in

one large urban school district with high numbers of ELs were randomly assigned to treatment or control conditions. There were 8 teachers and 649 students in the treatment group and 4 teachers and 372 students in the control group with a total of 12 teachers and 1,021 students participating in the study.

Teachers in the intervention schools received professional development in using the SIOP Model of instruction (Echevarria, Short, & Vogt, 2008). The SIOP Model consists of eight components (see Table 1) with 30 features that, when put into practice, have been shown to improve ELs' performance on measures of language and literacy (Dooley, 2009; Echevarria, Short, & Powers, 2006; Short, Echevarria, & Richards-Tutor, in press; Short, Fidelman, & Louguit, 2010).

The SIOP Model emphasizes the importance of language development across the curriculum, as well as providing ample opportunity for students to practice reading, writing, speaking, and listening skills. Because of the strong relation between oral language proficiency

Table 1 Eight Components of the SIOP Model of Instruction

Component	Description
1. Lesson preparation	The features under lesson preparation examine the lesson planning process, including the incorporation of language and content objectives linked to curriculum standards. In this way, students gain important experience with key grade-level content and skills as they progress toward fluency in the second language. Other features include the use of supplementary materials and meaningful activities.
2. Building background	Building background focuses on making connections with students' background experiences and prior learning, and developing their academic vocabulary. The SIOP Model underscores the importance of building a broad vocabulary base for students to be effective readers, writers, speakers, and listeners. In the SIOP Model, teachers directly teach key vocabulary and word structures, word families, and word relations.
3. Comprehensible input	Comprehensible input considers adjusting teacher speech, modeling academic tasks, and using multimodal techniques to enhance comprehension (e.g., gestures, pictures, graphic organizers, restating, repeating, reducing the speed of the teacher's presentation, previewing important information, and hands-on activities). The academic tasks must be explained clearly, both orally and in writing, with models and examples of good work so students know the steps they should take and can envision the desired result.
4. Strategies	The strategies component emphasizes explicit teaching of learning strategies to students so that they know how to access and retain information. Good reading comprehension strategies, for example, need to be modeled and practiced, one at a time with authentic text. SIOP teachers must scaffold instruction so students can be successful, beginning at the students' performance level and providing support to move them to a higher level of understanding and accomplishment. Teachers have to ask critical thinking questions as well so that students apply their language skills while developing a deeper understanding of the subject.
5. Interaction	Interaction features encourage elaborated speech and grouping students appropriately for language and content development. They need oral language practice to help develop content knowledge and second-language literacy; thus, student–student interaction is important and needs to occur regularly in each lesson. ELs need to practice important language functions, such as confirming information, elaborating on one's own or another's idea, and evaluating opinions.
6. Practice/application	Practice/application calls for activities that extend language and content learning by encouraging students to practice and apply the content they are learning, as well as their language skills. It is important to build and reinforce reading, writing, listening, and speaking skills within content learning.
7. Lesson delivery	Lesson delivery ensures that teachers present a lesson that meets the planned objectives. Successful delivery of a SIOP lesson means that the content and language objectives were met, the pacing was appropriate, and the students had a high level of engagement.
8. Review/assessment	English learners need to revisit key vocabulary and concepts, and teachers need to use frequent comprehension checks throughout lessons as well as other informal assessments to measure how well students understand and retain the information. Each SIOP lesson should wrap up with some time for review and assessment and time to determine whether the lesson's objectives were met.

Figure 2 Sample Protocol Component

LESSON PREPARATION

	4	3	2	1	0
1.	**Content objectives** clearly defined, displayed, and reviewed with students		**Content objectives** for students implied		No clearly defined **content objectives** for students
	Comments:				
	4	3	2	1	0
2.	**Language objectives** clearly defined, displayed, and reviewed with students		**Language objectives** for students implied		No clearly defined **language objectives** for students
	Comments:				
	4	3	2	1	0
3.	**Content concepts** appropriate for age and educational background level of students		**Content concepts** somwhat appropriate for age and educational background level of students		**Content concepts** inappropriate for age and educational background level of students
	Comments:				

Note. From Echevarria, J., Vogt, M.E., & Short, D.J. (2010). *Making content comprehensible for secondary English learners: The SIOP Model.* Boston: Allyn & Bacon.

and literacy (August & Shanahan, 2006), SIOP lessons focus on high levels of interaction between teacher and students and among students and include a variety of grouping configurations (i.e., pairs and teams). Other features of the model ensure that teachers use techniques that make instruction comprehensible for ELs so that they can participate in grade- level content lessons while expanding their English proficiency.

Measuring Fidelity of SIOP. Fidelity of teacher implementation was assessed using the SIOP, an observation instrument on which the SIOP Model is based. The SIOP is a valid and reliable measure of high-quality sheltered instruction (Guarino et al., 2001). A sample of one component of the protocol is seen in Figure 2.

SIOP Professional Development. Treatment teachers were provided an intensive two-and-a-half-day training to introduce them to the SIOP Model and its components. The training began with an overview of second-language acquisition to provide the teachers with an understanding of optimal learning conditions for ELs and their importance to this study. The participants then learned each of the eight components through the same process:

- The component and its research background were introduced via PowerPoint presentation.
- Participants watched a video that illustrated effective classroom implementation of the component and its features.
- Participants were asked to rate the lesson using the protocol and justify their rating.

This process led to a thorough discussion of each feature. Participants also participated in practice and application activities to show their understanding of the eight components. Finally, because the lessons the teachers taught for the research study were part of four curricular units (cell structure and function, photosynthesis and respiration, cell division, and genetics),

each participant was presented with a binder of materials. Each binder contained SIOP lesson plans for the four units of study as well as descriptions of lesson activities and handouts. Also included were the assessments for every instructional unit. Teachers were given time to review the binders and ask clarifying questions. Each teacher was prepared to implement the SIOP lessons at the conclusion of the training.

Classroom Instruction. Treatment teachers delivered SIOP lessons created by the research team while control teachers taught the same units using the same textbook but used their own lesson plans and teaching methods. Each of the SIOP lesson plans included the following elements: state standard, lesson topic, content and language objectives, key vocabulary, motivation (background building), presentation, practice and application, and review and assessment.

A key feature of the SIOP Model lesson plans used in the study was the inclusion of both content and language objectives that were aligned to state and national standards in science (content objective) and language arts and English language development (language objective). Teachers were instructed to post and state the objectives at the beginning and end of every lesson. This practice is based on the concept that integration of English language development across the curriculum is critical for improving ELs' English proficiency (Lee, 2005).

Coaching. To help support teachers in their delivery of SIOP lesson plans, coaching was provided to each treatment teacher by researchers who were experienced in implementing the model. The process for coaching was as follows:

1. The teacher and researcher (coach) reviewed the lesson plan together prior to the observation.
2. The coach observed and rated the lesson using the SIOP.
3. A debriefing session followed the observation using the completed SIOP.

To further assist teachers in following the SIOP Model, they were provided a "fidelity checklist" to help guide their implementation of the lesson plans. The elements of the checklist were to write and state both the content and language objectives, introduce and post vocabulary words, highlight vocabulary throughout the lesson, review the words at end of the lesson, and review each content and language objective at the end of the lesson and ask if it was met. Although all 30 features of the SIOP Model were present in the lesson plans, the checklist was intended to remind teachers of the importance of focusing on objectives and vocabulary development.

Observations were conducted approximately every other week with each teacher receiving a total of five observations. Interrater reliability among the observers was established prior to the beginning of observations using videotaped lessons to calibrate scores. Across the observations and raters, interrater reliability was calculated at 87%.

Pacing Guides. Both treatment and control teachers were provided with pacing guides to ensure that they were teaching the same content at approximately the same time and giving pre- and posttest assessments with each unit at approximately the same time.

Assessing Student Achievement

The assessments were curriculum based and examined science content knowledge as well as science academic language. The assessments required students to use the science language taught during the units to respond to content questions such as, "The continuous process of cell growth and division is called _____." There were a total of four assessments that measured four units of instruction: cell structure and function, photosynthesis and respiration, cell division, and genetics.

Students read a passage about a topic they had studied and answered a series of multiple-choice and fill-in questions. Prior to beginning each unit, students were given a pretest to establish baseline knowledge. A posttest given at the end of each unit measured growth in science content knowledge and science academic language.

The number of items on the four assessments ranged from 8 to 16. Reliability estimates were calculated for the assessments and varied based on number of items. Assessments with a higher number of items had higher reliability estimates, ranging from 0.462 to 0.786, which are in moderate range. When combining the items from all four assessments, a total of

42 items, we achieved strong reliabilities, 0.85 on the pretest and 0.88 on the posttest.

Fidelity to the SIOP Model

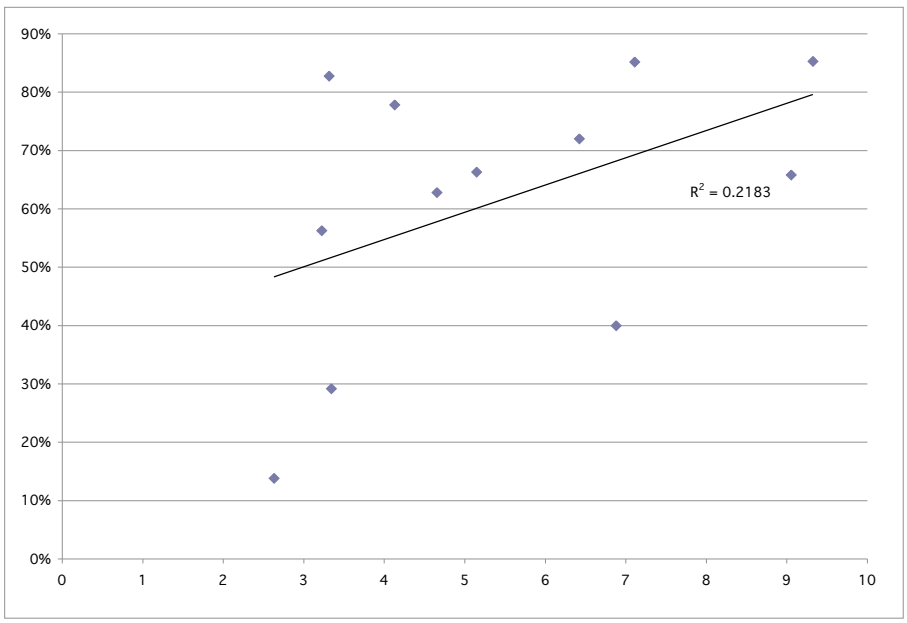
The professional development aspect of the study was intended not only to help teachers learn and implement the features of the SIOP Model but also to understand why the techniques are effective. Tapping into teachers' prior knowledge (in this case of second-language acquisition and the instructional needs of ELs) and further developing their understanding is an essential aspect of professional development. Understanding the underlying principles of instruction helps teachers make informed decisions when implementing the features in a way that keeps practice close to the original model (Seymour & Osana, 2003). Some variation in the way teachers used the techniques was expected, because we did not interpret fidelity as strict adherence to a step-by-step process or a scripted curriculum but rather as a level of quality that was manifested across observations.

As mentioned, teachers received scores on individual SIOP features, and the total score was calculated as a percent. We established three levels of teacher implementation based on protocol scores: high (75% or greater), moderate (50%–74%), and low (0%–49%). A total of 75% indicated that the teacher averaged a score of 3 on the features.

Teachers in both the treatment and control groups scored across these ranges. Some teachers in the control group were attuned to the instructional needs of ELs and implemented the features of the SIOP Model to a high degree even though they had not received SIOP training. Because we were interested in examining how fidelity to the model influenced student achievement, and not the efficacy of the professional development, we included teachers in both the treatment and control group in the subsequent analysis.

To examine fidelity, both the observation protocols and field notes written by coaches were used. Using the SIOP scores, we calculated each teacher's average scores across the observations and then plotted the teacher scores with the average growth of the students across the four assessments on a scatter plot, seen in Figure 3. Student average scores across the four assessments were determined using a simple average calculation, summing the growth from pre- to posttest across the four assessments and then dividing by 4. Overall the teachers who implemented the model with the greatest degree of fidelity (i.e., had the

Figure 3 The Relation Between Teacher Implementation and Student Gains



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highest scores) also had students who made the greatest gains.

To more carefully examine teacher fidelity to the model, we analyzed protocol items and field notes. These data showed that on each component of the SIOP (shown in Table 1), teachers who were high implementers had common teacher behaviors. We also noted that the difference between high implementers and lower implementers was not a matter of whether they implemented a specific feature but rather the frequency and degree to which they implemented that feature. That is, the more consistently the features were observed and were used in an effective way, the higher the score for the lesson.

For example, in the lesson preparation component, all teachers read the objectives to the students at the beginning of each lesson and posted them for students to see. However, teachers who implemented the model with greater fidelity did the following: asked students to read the objectives and explain them in their own words, explained vocabulary used in the objectives (i.e., observe, summarize), and redirected students' attention to the objectives throughout the lesson.

Within the component of comprehensible input, generally all teachers used some techniques to clarify concepts. However, high-performing teachers used a wider variety of techniques and consistently modeled what they wanted students to do. They repeated instructions multiple times and explained activities and concepts in multiple ways.

For the interaction component, nearly all teachers provided some opportunities for students to work in pairs or groups, as directed in the lesson plans. However, high-implementing teachers used a variety of grouping configurations and provided frequent opportunities for students to interact. They gave students ample time to discuss questions or material in pairs, groups, or teams. They also did quick interaction activities such as think-pair-share when they wanted students to make predictions or check for understanding. The interaction activities provided abundant opportunities for students to practice language skills.

We observed that in the SIOP treatment condition, the low implementers taught many lessons that did not "look like" SIOP teaching but instead reflected the characteristics of typical teacher-dominated instruction. Also, some teachers did not sufficiently prepare for lessons; they read directly from the lesson plan we provided as they gave directions or asked questions of the students.

Although the lesson plans included a number of opportunities for students to interact with one another or work in small groups, sometimes the teachers omitted that part and used whole-class instruction instead. Overall, low implementers did a disproportionate amount of talking, which deprived students of important opportunities to practice using academic English in meaningful ways, which is a hallmark of the SIOP Model.

Discussion

In our study, the professional development was designed to include many of the elements that research supports to facilitate teachers in implementing the model with fidelity. However, like many professional development efforts, we experienced less than optimal conditions that are recommended in the research literature.

Some issues that prohibited more sustained support for the teachers included finding time for pre- and post-observation conferences, lesson preparation time, union contract restrictions, and the constraints of the study timeline. These kinds of limitations are not unlike those that occur in many school settings. Even within this context, there was variation in the extent to which teachers "got it." When we studied the variation, we found that the extent to which teachers implemented the SIOP Model with fidelity influenced student effects.

The reasons for teachers' differential responses to professional development are beyond the scope of this article. However we can offer some possibilities as they relate to our study.

One reasonable explanation may be that some teachers require more support than others to learn and implement new practices well. Some of the instructional techniques used by the high implementers differed from low implementers more in degree than

in kind. In other words, all students benefit from having tasks clearly explained, but for ELs it is critical to make the explanation understood, for example, by describing the task in plain words, showing a completed model, and repeating the explanation more than once. Perhaps if the low implementers had received support through a learning community or had had more intensive coaching, they would have used effective practices to a greater degree.

Another possible explanation is that some teachers require more time learning and practicing new strategies and techniques than do others. Because of district scheduling, our study took place over the course of one semester, which afforded teachers a relatively brief exposure to the SIOP Model. Changing teacher practice requires significant time and ongoing support (Saunders et al., 2009); therefore, we hypothesize that with more intensive and sustained support over time, more of the teachers in this study would have implemented the SIOP Model to a high degree. However, a confound that must be considered is the possibility that the highest implementers were simply the best teachers.

The data from our observations and field notes have several implications for schools and districts. First, the SIOP allows fidelity to be rated on a continuum. This is different from fidelity measures that only rate instructional practices as present or absent. In our study, all teachers would have been rated as implementing the practices with fidelity, because there was evidence of the features. However, it was the degree and frequency that distinguished high implementers from low implementers. As schools and districts choose observation instruments to examine fidelity (and teacher effectiveness), it is important to consider protocols that provide a continuum of indicators. Finally, not all measures of fidelity are reliable and valid instruments, as is the SIOP. This is another important consideration in choosing an observation instrument (Cordray & Jacobs, 2007).

Focus on Fidelity

Best practice in literacy development of ELs involves consistent application of research-based practices in the classroom. As our study shows, there is a direct relationship between level of implementation and student achievement. While many schools have constraints such as lack of time and resources devoted to ongoing professional development, a focus on fidelity must be a priority in order for teachers to implement research-based literacy practices well, which in turn helps ELs meet high academic standards.

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Echevarria, Richards-Tutor, and Chinn are from California State University, Long Beach, USA; e-mail jechev@csulb.edu, crichar4@csulb.edu, and vivanp@gmail.com. Ratleff is from the University of Southern California, Los Angeles; e-mail pratleff@gmail.com.