

Jana Echevarria

I so appreciated the presentations this morning. It's not surprising; but encouraging: the coherence amongst the projects and presentations in terms of what our interests are, what the issues are. As Freddy said, our study is part of the CREATE Center. We're focusing on the academic uses of English in the area of science. Deborah Short and I are the principal investigators on this study.

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To set the context for the study: We've been hearing all morning about the persistent underachievement of English learners, but one of the contributing issues to the underachievement is the fact that many teachers are really unprepared or underprepared. Many are somewhat prepared but underprepared to really meet the needs of this population and to deliver the kind of rigorous instruction that Aída spoke about and that we'll talk more about also.

Few teachers are trained -- especially at the secondary level-- to teach students that initial literacy that they may be lacking or content area literacy. Currently, English learners are being tested in mathematics and reading under NCLB. And in 2007/2008, the tests are also in science, so that's one of the reasons that we began focusing on the content area of science. It's very heavily language-laden, and it's typically a difficult content area for English learners.

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We know from some research that's been done that most English learners need between four and seven years to learn English before they reach average academic performance, and just by definition, 'English language learner' implies that that's exactly what they are. They are students who are learning English. But although they're not proficient in English as yet, they will be tested in English before they're completely proficient. [slide 4] So what do teachers need to do to help close that achievement gap

that's so perplexing and has been so persistent? One of the things that we advocate from our work is that teachers need to incorporate both language objectives and content objectives in lessons. It's not enough, it is not sufficient, for English learners to have a period of time in the day when there's a focus on English language development, and then the rest of the time, presumably, they're learning content. To be a fluent English proficient learner, to be able to grapple with the content—that rigorous, standards-based content—we need to have language built in across the curriculum. When we first introduced this concept—back in 2000 when we first published the SIOP Model, it was met with a lot of resistance. And content area teachers would just say, "I'm a science teacher"; "I'm a math teacher"; "I'm a social studies teacher." "I don't know about language; I'm not a language teacher," and so forth.

Over time, it's been very encouraging to see how much this has become part of the discourse. There's much wider acceptance of the fact that all teachers really need to be teachers of English. Teachers need instructional strategies and approaches that can reduce the achievement gap between English learners and their native-English-speaking students. [slide 5] So one approach—one set of strategies, if you will—is *sheltered instruction*. And we've defined in our research what *sheltered instruction* means: it's a means for making academic content—whatever the academic content is, science, math, social studies, and so forth—more accessible for English learners while, at the same time, promoting their English language development. So it's really two-fold. There's the content we want them to have. We want to have rigorous standards-based content, not watered down; we want really strong content but also an approach to teaching that, at the same time, is developing the students' language.

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What we found when we began our work was that there wasn't really an agreed-upon way to do this. It sounds good. A lot of teachers were familiar with the idea and knew

some kind of pick-and-choose strategies to use but what we needed was a comprehensive model of how to really, on a day-to-day basis, implement high quality instruction for English learners. So through a former research center, CREDE, Deborah Short and I conducted a seven-year project where we worked collaboratively with teachers to develop this model of sheltered instruction, and we field tested the model, and we field tested professional development. [slide 7] And the result of that effort was to have both an observation protocol to go into classrooms and really be able to quantify the level of implementation of these practices—these features—that we know to be effective with English learners and also a delivery model—a lesson planning and delivery model.

[slide 8]

For those of you who are unfamiliar with the model, it has eight components and 30 features. The first component is *preparation* and under that, the features emphasize the need to have both a language and a content objective. Another component is *building background*. We want to take what these students bring to the classroom [and] tie it into the lesson. We have information to give, but they also have experiences and so forth that can be tied together for a much more powerful lesson—one that they can connect to. And also, under *building background*, we want to emphasize a lot of vocabulary development because we know how important that vocabulary is for academic achievement.

A third component is *comprehensible input*. Those are all those good ESL techniques that we know: using visuals, using gestures, doing whatever a teacher can to make the information more understandable and comprehensible for the students. Another component is *strategies*. These are learner strategies. Many of our students are undereducated. They have gaps in their educational background, and they may not know how to tackle information. They may not know how to find the main idea. They may not know when you read through something and you don't understand it, that good readers utilize strategies

like re-reading, highlighting, taking notes, et cetera. So we explicitly teach students how to use those good learner strategies.

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Interaction is another component. We want students practicing using academic English. We want them to have lots of opportunities to engage with the teacher, with their peers, and have that opportunity to really develop some oral language skills. Then we also emphasize *practice and application*. We teach a concept, the students talk about it and have some opportunity to apply that concept so that they are practicing it, they are using reading, writing, speaking, and listening so that it's meaningful, and they're using academic English again. Then *lesson delivery* simply is: Does the lesson meet the objectives that were set forth? Is the pacing right? and so forth. And then, finally, *review and assessment*: so we want to wrap up the lesson by reviewing the vocabulary and concepts.

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So as you can see, from those eight components, the SIOP model shares many features that are part of high quality instruction for all students, such as cooperative learning, the strategies that I mentioned, emphasis on the writing process, and differentiated instruction. But it also accommodates those distinct second language development needs of our English learners. We often hear, oh, they'll see the eight components and the features and the teachers will say, "Well, this is just good teaching." Well, it is good teaching, but it also needs to pay particular attention to the language needs of our English learners.

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In particular, in terms of academic English, it contains a lot of features such as, as I mentioned, the language objective, developing that background knowledge, areas that they may need some help in supporting, and then acquisition of content-related vocabulary and emphasis on academic literacy practices. The model is not a step-by-step way of teaching;

it really is a framework for organizing instructional practices and it allows for variation in the classroom. In fact, in this study, I did a baseline videotape of our teachers, and they taught the same lesson but there was quite a bit of variation in the way that that lesson looked, although all of the features were touched upon. So it's in no way a step-by-step process.

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When we first developed the model through the CREDE research project, once it was developed, then we wanted to say, "Well, does it matter?" You know, "Does it have an impact on students?" And so what we did was a pre- and post-test study looking at expository writing. We felt that was an area to examine because that is really tough for English learners; isn't it? And so, what we found through this study was that students who were in the classes with SIOP trained teachers outperformed the students that were in classes where the teachers had certification for teaching English learners but didn't use the SIOP Model. [slide 13] This was a quasi-experimental study and here's just a graph to illustrate the changes and the gain that the SIOP students made. [slide 14] And that study is published, in case you're interested in looking at that.

But as David mentioned this morning, one of the issues with the SIOP Model is that it took off because of the tremendous need that districts were facing, yet the implementation of the model has far outpaced the research base. And so as researchers, we're very interested in still examining the model. Practitioners like it and want to use it—it's used in all 50 states—but we want to say, "okay, let's take a closer look at it and see what are the features that are particularly salient, in what context does it work." And so Debbie is going to talk about our current study with CREATE. [slide 15]

Deborah Short

[slide 16]

So as you heard a little bit this morning, this study is looking at the SIOP Model in a randomized format. We have five years to look at this. We have a couple of small studies

and then, hopefully, we will work with some of our other colleagues and create an integrated model. As Jana said, we had some quasi-experimental work that we did with the original CREDE study and some work in New Jersey that Carnegie and Rockefeller have funded that we've just completed. We also know that some school districts have conducted program evaluations with the SIOP Model. But we haven't had these randomized controlled studies as of yet. That's what we're hoping to do here.

But I want to call your attention to the third bullet up here because this is another thing that we're doing that will be slightly different from the past. In the past, we trained some teachers and we didn't train other teachers. They had similar students. And we looked at both teacher change and student performance. What we're adding to this study this time is a type of jump start. We really want to see if there's a way to help the teachers really grasp the SIOP Model and implement it in their classrooms sooner.

Mostly, it takes teachers one year—and some teachers two years—to implement the SIOP Model to a high degree. But by providing some curriculum units—about a quarter's worth of material with lesson plans and all of the ancillary materials—we're hoping that the teachers will get into the model a little bit faster and then be able to use it on their own.

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So in terms of our research questions, the first one really focuses on our work for the first three years where we have these smaller-scale studies. We want to see if the SIOP Model will affect student performance in terms of academic language development and their content comprehension of science. The second question we'll be answering, hopefully, later on, in years four and five when we bring together the findings from the other research studies that Diane, Catherine, and Sylvia will talk about as the next two days go on.

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We have some hypotheses, as you might imagine, and one is that the students of teachers who are trained in the model will outperform the students of teachers who are not

trained in the model. But then, looking at the teachers themselves, we'll have some that receive these jump start units—these lesson plans—and we'll have some that don't. So we want to see whether the jump start both helps in terms of teacher change and in terms of student performance.

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What we did in year one was a pilot study. One of the things that we really felt was important to start to put our fingers on, was to really identify: "What is a scientific language assessment?" because we don't really necessarily know if our students can do the language of science. So in our first year, not only did we pilot the curriculum units that we're working on but we developed some language assessments of science and piloted those as well.

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What you see here are samples of some of the literacy skills that we tried to build into our SIOP science lessons. The teachers that we were working with helped us sit down and think about it. If you're going to use the language of science, what do you need to do? What are some of the skills and tasks? You need to, for example, be able to ask a research question, form a hypothesis, conduct an experiment, and then write up the results, summarize them, draw conclusions. So as we were developing our units, we tried to make sure we were building those skills directly into the lessons and providing explicit instruction for the teachers so that they could share the knowledge of how science works in the classroom with those students.

[slide 21]

What you have in your handouts is a sample of the lesson plans that we've put together. Those of you that are familiar with the SIOP Model, you'll recognize the format. Again, we have our language and content objectives; we have our key vocabulary; the types of materials that should be used. If there are worksheets or other things, we've

provided those for the teachers. In the schools where we have worked, we also make connections directly to the curriculum they have and the textbooks that they are using.

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And you'll see again it's not an unusual lesson plan: there's a warm-up, a building of background, a presentation of information, practice, some application, and some review, which, of course, we know is so critical for our second language learners.

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In terms of the language assessments, we really tried to think through how do we make sure, first, we're not assessing just social language—which, unfortunately, far too many ELP tests have done in the past—but also try to limit the amount of content that we are assessing—and that was really tough, teasing apart the language of science and the scientific content.

But what we did was use some of the criteria that WIDA developed. Some of you know that it's the *Access for ELLs* test. There's a 15-state consortium that worked on WIDA and they developed ELP standards and then developed a test that really looks at the academic language in the different subject areas. So we used some of the WIDA guidelines and then we also--fortunately, for those of you that are coming to dinner tonight--we looked at the work that Alison Bailey and Frances Butler had done with their CRESST research in terms of test writing and thought about the range of difficulty of items and how to craft the prompts or the questions so that students would even understand what we're trying to ask them to answer.

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What you'll see when you look at the sample that you have in the handout are these particular features. One of the things we felt it was important to do was to make the assessment friendly to the students. We were going to have classrooms where we would have newcomers, beginners, advanced students, and, in some of our situations, we have

heterogeneous classrooms with native English speakers. We didn't want to turn off students from even trying the test if they were at a lower proficiency level.

So although we did have a range of difficulty within the items, we also provide visual support and context within the sample. So there are pictures; there are bolded words. We are really trying to tap into whether or not the students can figure out the language of science and then perform: develop through some productive work; show us that they understand the language of science. And so all of the assessments also have short and longer written responses so that we can look at the literacy skills in that way. And, here are, again, some of the samples that you have. [slide 25-28]

[slide 29]

In terms of scoring, certainly, for the multiple choice, it's pretty straightforward, and for the short answer and fill in the blank kinds of questions, but in terms of the written essay, we again decided to use a modification of the IMAGE exam. We are in the home state of the IMAGE exam; it stands for the Illinois Measurement of Annual Growth in English. This was important for us because, as you can see, it has five subscales, five areas where we can look at writing from a holistic manner. Because we were doing the intervention in quarters—about nine or 10 weeks—it's not a lot of time for students' language growth necessarily. By using the IMAGE exam when we piloted it, we were able to see change within the students even within those nine weeks, in part, because of the fine distinctions that the rubric offers us.

In the actual scoring process, we had two raters and we established an inter-rater reliability as well, but Jana will talk more about that because it's her part of the study here.

Jana Echevarria

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So as Debbie said, year one was the pilot, and then year two was the first study on the West Coast. And just as an overview, it was an experimental design where we randomly

assigned schools. Middle schools: we started out with 10 and we had five as the SIOP schools and five were comparison schools. Two later—after the study had started—withdrew because it was additional work on the teacher's part, and it just speaks to the difficulty researchers sometimes encounter in working with schools. But three very generously decided to stay in the study although their teachers did not get the training initially.

What we looked at was 7th grade science classes, and the idea was to introduce the teachers to the SIOP Model. They were given two and a half days of training. That also included giving them a big binder full of all of the lesson plans, the assessments, all of the ancillary materials, as Debbie mentioned, and we walked them through what the units would look like. And then students were administered pre- and post-test assessments for all of the units. [slide 31] The specific activities were that after we piloted the lesson plans to see that they were effective, we worked with some teachers in that district over the summer and ended up developing all of the units, all of the lessons for the four units: cell structure and function, cell division, photosynthesis and respiration, and genetics. So they had a nice set of materials to use to teach those four units. With each unit, we gave a pre-test before they started teaching and then a post-test at the end. Debbie just covered those language assessments which were part of the assessment battery.

And one of the things that we found absolutely necessary was the coaching aspect. I think Aída said it—or someone has already mentioned it this morning: obviously, teachers don't start implementing something to a high degree immediately. And even our really excellent science teachers required that in-class coaching. So they had an expert come in, observe them, have the pre-conference, teach the lesson, and then debrief afterward about it (Did you really hit the vocabulary?, et cetera), because we wanted them to be sure not to neglect that language component of the lessons. And then, of course, we compared the data from the SIOP classes to the control classes.

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The breakdown of student participants, as you can see, is on the slide. One of the questions that we want to look at is, "Does it do no harm?" Because sometimes, we hear from teachers their concern: "What do I tell parents of English only students who are in these classes?", "What about my advanced students?", and so forth, and so we thought this would be an opportune time to look at different subgroups of students to see, "Do they make progress or do they actually decline in progress because of this approach that was really initially designed for English learners?"

And so what we have are English learners, those students who have been re-designated within the past three years, students who have been re-designated as fluent English proficient for more than three years, and native English speakers. So we have scored the essays and scored the instruments. [slide 33] And in some preliminary analyses, we have some promising results and we'll be having actual analyses done very soon so that we can report what came of all of this in terms of the different groups.

Deborah Short

[slide 34]

In year two, the first and third bullet on the slide were the areas of interest for Jana's study where the teachers who were SIOP trained were also given the units and compared to the control teachers. It's in year three now that we're looking to have two different treatment groups plus the control. We'll have one group of teachers that receive the SIOP training plus the units, and a second group of teachers that receive the SIOP training alone. Both of these teacher groups, however, will receive similar types of coaching. And then we will look at the controls. So these tie back to our research questions to see whether or not these curriculum units help jump start the implementation process.

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Years four and five, as I mentioned, are where we're hoping to pull together the data from the other CREATE studies and create an integrated model of school reform that we can then test more broadly across various sites across the country.

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So, in summary, these are the things that we are asking teachers to do: that they work with the students to develop deep knowledge of scientific terms and other key academic vocabulary: how to use it in classrooms; how to get the kids to use the language, not just recognize the language, how to help the teachers build background knowledge among the students but also respect some cultural differences especially when we think about science. There are different ways of understanding the world around us. We want them to share, of course, what we know scientifically, but be sensitive to some of the students' cultural beliefs.

We really want to focus on more academic discussion in class. It's not just reading and writing we keep trying to tell the teachers. We want the students to sound like scientists. We want them to be able to have a conversation, to be able to argue, to make claims, to provide evidence to evaluate those claims, and we want them to be able to do this orally as well as in writing. And then we have other things, of course, that we work with these teachers on in terms of helping the students deal with text, helping them with the writing process—scientific writing. Really, in general, the bottom line is to help teachers so that the students can learn both language and content in the science classrooms.

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And for more information, we have information on the SIOP Model at the SIOP Institute site and then, of course, at CAL on our CAL site. And then the research project itself is housed on the CREATE pages at the CAL site.

Thank you.

