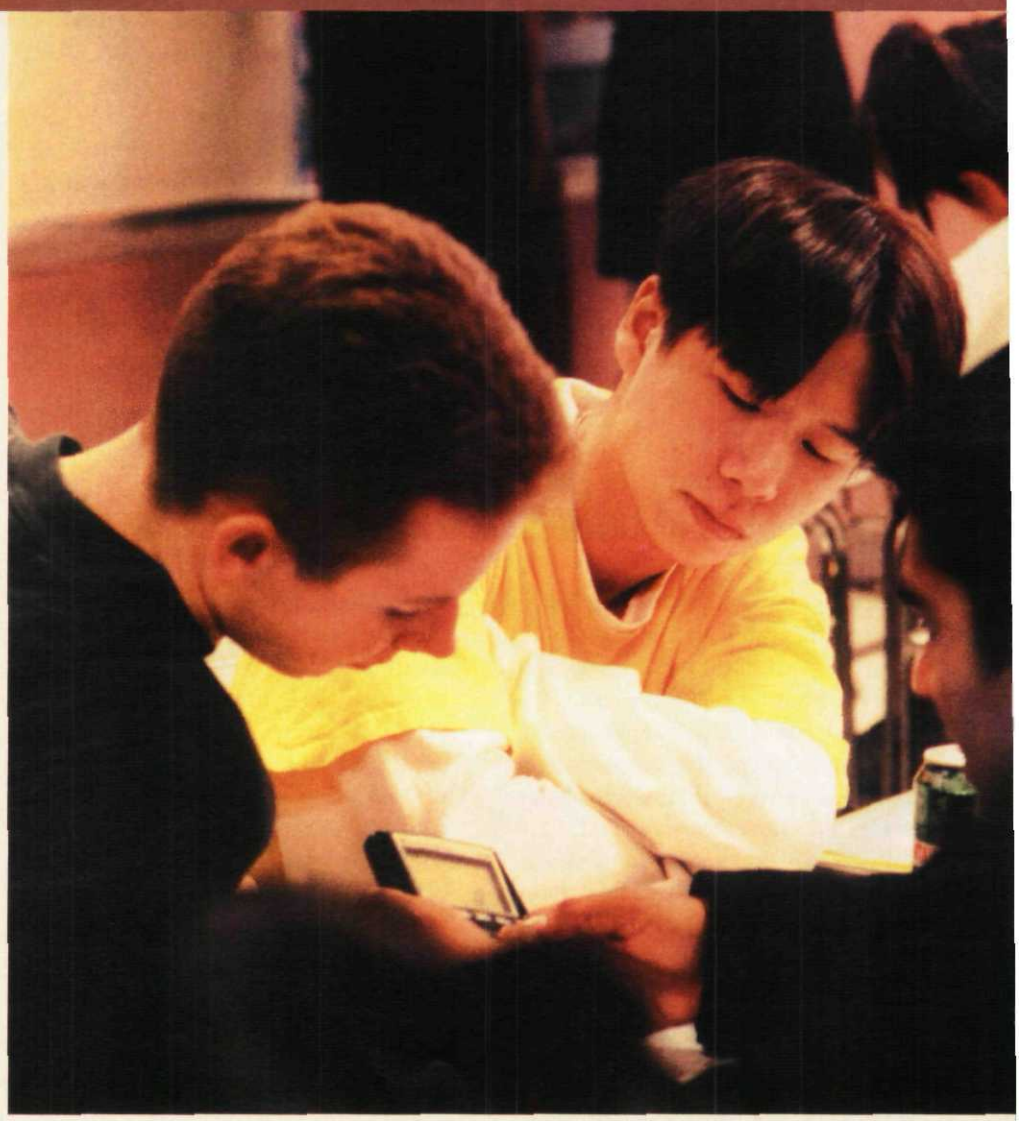
Getting at the

English language learners can more easily master content when teaching practices incorporate strategies for language learning.

Yu Ren Dong

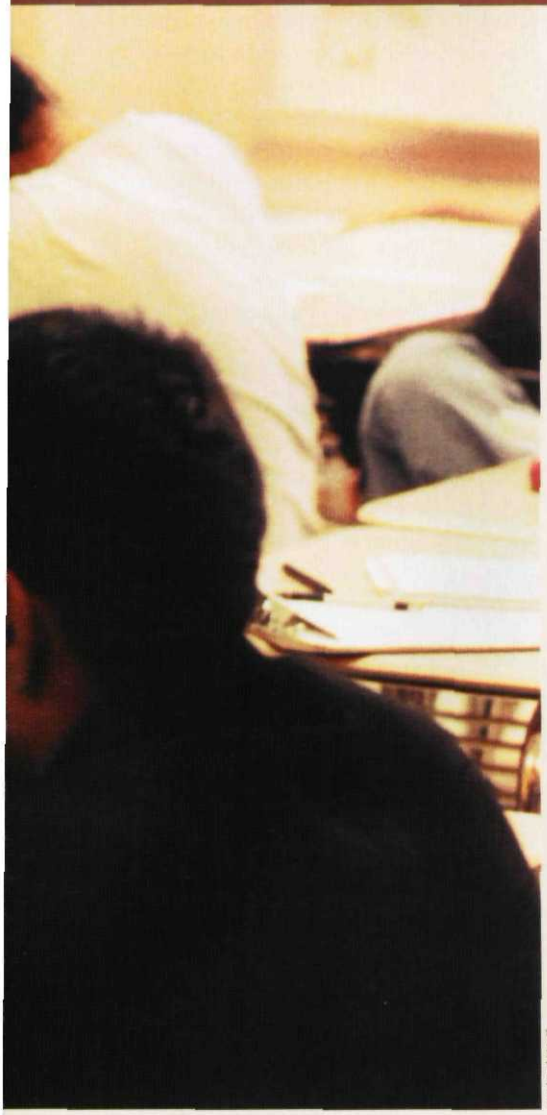


Many subject-matter teachers are currently asking themselves how they can help their English language learners. Integrated into mainstream subject-matter classrooms, these students are expected to use sophisticated English language and literacy skills—skills that they are in the process of acquiring in their English as a second language (ESL) classes—to master challenging academic content (Carrasquillo & Rodriguez, 1996; Dong, 2002, 2004a, 2004b; Genesee, 1993). Maria,[1] a 9th grade science teacher, describes a familiar scenario:

> In my classroom, I have ESL students and students who are newly mainstreamed. Students who do not understand the language usually have blank looks on their faces. Some of them try to make sense of the words by using electronic translators during the lesson. [They] usually get behind and understand only half of the day's material. The next day, these students start further back in the material than their English-speaking peers and end up lost in the curriculum.

With the implementation of tougher high school graduation standards and standardized achievement tests, subject-matter teachers in secondary schools are increasingly wondering how they can effectively teach students with limited English language skills. Research in second-language acquisition has shown that adapting classroom discussion, textbook reading, and written activities to the language proficiencies of English language learners triggers English language acquisition in subject-matter classrooms (Dong, 2002, 2004a, 2004b; Kidd, 1996; Swain, 1996). Much discussion has focused on making subject-matter teachers more aware of students' linguistic and cultural backgrounds, but little discussion has focused on strategies that teachers might use to integrate language and content in mainstream subject-matter classes to facilitate English language acquisition (Swain, 1996).

Content



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Language in the Classroom

Second-language researchers point out a number of issues that mainstream subject-matter teachers would do well to tackle. Subject-matter teachers should systematically teach discipline-specific language. They should also pay attention to the functional use of language in classroom discussions. Language in the classroom focuses on such elements as checking for understanding (as in "Do you follow?"), summarizing (as in "The main point here is. . . ."), and defining (as in "What does this mean?"). A language learner who is unfamiliar with the functional use of language in classroom discussions or who has acquired a functional use of a different language in the classroom might have difficulty understanding, let alone participating in, the discussion.

Teachers should also use writing as a learning tool to promote language development (Carrasquillo & Rodriguez, 1996; Dong, 2002, 2004a; Mohan, 2001; Snow, Met, & Genesee, 1989; Swain, 1996). It is important to align English language learners' writing assignments with the students' language-development needs. For example, journal and poetry writing can facilitate students' mastery of personal and expressive language. Comparative writing—comparing and contrasting concepts, procedures, and stories—can help students develop comparative language structures. Descriptive writing about a historic event or a scientific phenomenon encourages students to purposefully and meaningfully use appropriate logical connectors and verb tenses.

The caliber of classroom discussion is an important consideration in any type of classroom. Several studies have examined classroom discussions in mainstream subject-matter classes that enrolled substantial numbers of English language learners (Harklau, 1999; Verplaetse, 1998). These studies have shown that teachers in such classrooms tend to talk more about procedures than about the significance of the subject matter and generally pose less cognitively challenging questions to English language learners than to native speakers of English. Subject-matter teachers need to systematically guide English language learners'

> progressive use of the full functional range of language and support their understanding of how language form is related to meaning in subject area material. (Mohan, 2001, p. 108)

This relationship between language form and meaning is reflected, for example, in the multiple verb tenses found in historical documents, in the logical transitional phrases so abundant in scientific arguments and mathematical procedures, and in the third-person point of view common to persuasive writing. Subject-matter teachers should identify the language that students specifically need to know—including the language structures and essential vocabulary that a teaching unit requires—and integrate these topics into daily instruction.

Teachers also need to be aware of students' English proficiency levels and cultural and education backgrounds so they can tailor their instruction to specific language needs. In New York City, for example, English language learners' proficiency levels are measured by the students' performance on the standardized test LAB-R (Language Assessment Battery Test Revised). Students place in one of three language proficiency levels: beginning, intermediate, or advanced. Subject-matter teachers can learn about their students' proficiency levels by referring to the students' program cards, which often list English language levels and placement. Teachers can also get this information from the ESL teacher or department.

During the last eight years, I have

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worked with mainstream subject-matter and ESL teachers, English language learners, and administrators to develop methods of addressing English language learners' needs and integrating language into content instruction in mainstream subject-matter classes. I offer here some examples of effective teaching strategies that three high school subject-matter teachers used to integrate language and content in their classrooms.

Meaningful Mitosis

Sally, a 9th grade biology teacher, teaches a class that includes English language learners, newly mainstreamed ESL students, and native speakers of English. In preparing her lessons on the complex biological process of mitosis, she first asked the school's ESL teacher to help identify language that might pose difficulties for her English language learners. After the consultation, she created a vocabulary table that delineated the specific language used to describe the sequence in the mitosis process (see fig. 1).

Using simplified words in conjunction with academic language creates a context-rich environment for academic language acquisition.

In addition to the biology words and phrases that all the students needed to learn—such as *replicate*, *duplicate*, and *condense*—Sally included in the table such everyday terms as *stick together*, *make copies*, *move to the center*, and *separate* to provide language support for her English language learners. Considering that mitosis is a complex and abstract concept, Sally designed a hands-on activity using construction paper that enabled her students to visually and kinesthetically simulate the mitosis process. Working in pairs, students cut the construction paper into the shapes of chromosomes and cells and graphically reproduced the sequence of the mitosis process. Sally showed the vocabulary table to her students and asked them to explain to the class—using this vocabulary—what they had just illustrated graphically. After the students mastered both the concept and the language, she asked them to write a description of the mitosis process. Here is a sample of how one English language learner depicted the various steps:

1. Cell grows to adult and gets ready to divide.
2. Father chromosome and mother chromosome come together. They make daughter chromosomes.
3. Daughter chromosomes stick together in center of cell.
4. They then separate and become two individual chromosomes.
5. They go to opposite sides of the cell.

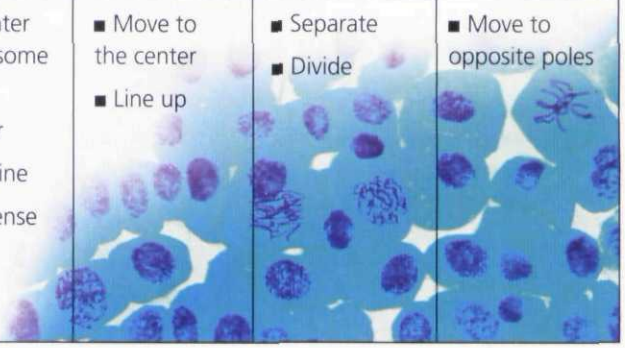
With the help of Sally's vocabulary table, students were able to combine their sentences into a paragraph that incorporated these scientific expressions. The teacher also introduced appropriate transitional words, including *first, then, afterward,* and *finally*. After following these steps, the same student wrote the following paragraph:

> When the father chromosome and the mother chromosome come together, they form a cell. They then go through the mitosis process. First in interphase, each parent chromosome makes a copy of itself. Then during prophase the daughter chromosomes stick together and look like double chromosomes. Afterward, these chromosomes go through metaphase as they move to the center of the cell and line up. They then go through anaphase in which they separate and become two individual chromosomes. Finally, these individual chromosomes move to opposite poles of the cell and the cell divides and goes through the mitosis process all over again.

In her lesson on mitosis, Sally used several important strategies to improve student comprehension. First, instead of taking language for granted, she asked for the ESL teacher's input on the language part of her lesson. The collaboration generated a chart that sequenced the complex concepts of mitosis in manageable chunks and pinpointed the specific vocabulary that the English language learners in the class needed to master to fully comprehend the topic. Also, having students illustrate the mitosis process through hands-on learning before verbalizing it proved successful because students focused on meaning first. The activity gives learning a context in a way that memorizing abstract terms cannot, and it enables students at lower levels of language proficiency to participate in the learning process. Once the students were able to articulate in sentences their understanding of mitosis, they had sufficient language support to create a paragraph.

FIGURE 1 Key Words in Mitosis

Interphase	Prophase	Metaphase	Anaphase	Telophase
■ Mother chromosome ■ Father chromosome ■ Make copies ■ Replicate ■ Duplicate ■ Double	■ Daughter chromosome ■ Stick together ■ Combine ■ Condense	■ Move to the center ■ Line up	■ Separate ■ Divide	■ Move to opposite poles



What Would You Have Done?

Joe, an 11th grade social studies teacher, teaches a class that includes both English language learners and native English speakers. In a unit on World War II and the dropping of the atomic bomb, Joe tried to ease the potential difficulty of reading the textbook by having students read excerpts from Hersey's *Hiroshima.* Students also read a modified historical essay on the topic. On the basis of their readings, Joe and his class came up with a graphic representation of decisions that President Truman could have made about whether or not to drop the atomic bomb on Japan (see fig. 2, p. 18).

To familiarize his English language learners with the correct use of language structure, Joe asked the class to use the following sentence structures: *If I were . . . , I would. . . .* and *As President Truman, I would. . . .* One English language learner's written response follows.

> *If I were Dr. Tabuchi [a physician who experienced the event firsthand], I would* have panicked. From the first person I saw, I would have fainted. But being a doctor, I would have tried to at least help the people that I think could have survived this horrible thing.
>
> *As President Truman, I would* never question what I did that day. I won't feel bad. Did Japan feel bad when they bombed and destroyed our ships and killed our people? If I feel bad and am sorry for a country, I won't go to war or even be president. That's my job to be stronger than anyone else emotionally and mentally.

What is noteworthy about this unit is the way Joe engaged his English language learners in responding to this piece of world history. In the decision chart, he provided language support for his English language learners by clarifying certain words or expressions. For example, he showed in parentheses that *suppose* means *what if* and that *intimidated* means *scared.* Using simplified words in conjunction with academic language does not sacrifice academic content but creates instead a context-rich environment for academic language acquisition.

In addition, Joe assigned fiction and modified primary source reading to his students because such reading not only provides authentic materials for learning historical content, but it also breaks down dense textbook language to enhance comprehension. These texts promote student engagement by bringing the students closer to the topic under study.

Finally, Joe asked the students to write two different responses: one from the first-person perspective of someone who has witnessed the devastation of the atomic bomb and the other from President Truman's perspective. Using modified texts, graphic organizers, language supports, and multiple perspectives on the issue, Joe engaged his students at both the content and language levels. By building these linguistic bridges (Gibbons, 2003), Joe not only helped his students with the assignment but also broadened and enriched their language so that they could construct new content knowledge.

The Language of Life

Before teaching biology to a class of English language learners, Terry, a high school biology teacher, took a course in second-language acquisition and several multicultural education courses through her masters program. Terry understands that comprehension is key, and she pays special attention to creating a rich and meaningful context for learning scientific language. Keenly aware of language issues embedded in biology textbooks, Terry decided to explicitly teach biological language. In the process, she built a positive environment, encouraging students to ask questions, think on their own, and articulate those thoughts.

The following exchange on the classi-

FIGURE 2 Decision Chart

As President Truman, should I drop the atomic bomb on Japan?

Decision	Disadvantages	Advantages
Tell the Japanese that we have developed an atomic bomb and invite them to see the test in New Mexico.	We have only two atomic bombs. Suppose (what if) the first one fails to explode? Suppose the Japanese are not impressed or intimidated (scared) by it?	Japan may surrender (give up). We can avoid much loss of life.
Drop the atomic bomb.	Thousands of Japanese will be killed, including civilians (men who are not fighting as well as women and children).	This should force Japan to surrender and will save U.S. lives. It will also show U.S. military power and its influence in the world.
Don't drop the atomic bomb but continue with conventional (air) bombing.	Many lives—both U.S. and Japanese—will be lost. It might be a long battle, with a possible invasion of Japan.	Future generations won't be held responsible for (won't have to account for) the devastation (sadness over the huge damage) caused by atomic bombs. The United States won't be the first and only nation to use atomic weapons.

fication of organisms took place in Terry's class.

Student 1 [addressing the teacher]: What's the difference between an autotroph and a heterotroph?

Teacher: Terrific! What *is* the difference between an autotroph and a heterotroph? [The class is silent.] Look at the word. [She points to the word *autotroph*.] *Auto* means what? Remember what we said about an automatic car? So auto means . . .

Student 2: Itself.

Teacher: Exactly.

Student 3: My dad has an automatic car.

Teacher: What makes it automatic?

Student 3: It changes gears by itself.

Teacher: Wonderful! That's why it's called automatic. So an autotroph is . . .

Student 4: An organism that makes food by itself.

Teacher: Yes, it makes its own food from raw materials.

Student 5: We make our own food.

Teacher: Well, we can go into the kitchen and make our own food. But we can't make it from raw materials, like sunlight and water, and another word for *make* is *produce.* [She writes *produce* on the board.] Autotrophs produce food. That's the difference. Heterotrophs—like you and I and the rest of the animal kingdom—can't produce our own food. So how do we get food?

Student 4: By hunting.

Teacher: Hunting? How do you get your food? [She asks student 5.]

Student 5: By cooking.

Teacher: Hunting, cooking, growing, fishing, and going to Pathmark. But autotrophs can't pick themselves up to hunt, go fishing, or go to Pathmark. They have to find another way. So what is a heterotroph then?

Student 6: A heterotroph is an organism that can't produce its own food.

In my yearlong observation of Terry's classes, the teacher showed special interest in the questions that students asked. When the student in the example asked about the difference between an autotroph and a heterotroph, Terry engaged the students in thinking about the morphological aspect of the language. By offering extensive real-life examples to create a rich context for meaning, she led students to discover the meaning for themselves. The dialogue between Terry and her students focuses on content and meaning rather than on procedures. During the lesson, one student thought humans were autotrophs because humans make their own food. Grasping that teaching moment, Terry introduced the key difference between the two terms by using synonyms and additional examples to construct new knowledge.

With Language in Mind

These teachers' efforts suggest ways in which mainstream subject-matter teachers can identify and teach discipline-specific language within subject-matter classrooms. It is helpful for subject-matter teachers to collaborate with ESL teachers to plan and provide instruction that keeps both curricular objectives and language objectives in mind (Kidd, 1996). For example, an English teacher presenting Langston Hughes's poem "Harlem" might specify the following two language objectives:

(1) Students will develop their expressive vocabulary, such as adjectives describing their American dreams, and (2) students will familiarize themselves with the ques-

tioning technique that Hughes uses in the poem to engage the reader.

Integrating language into content instruction in mainstream subject-matter classrooms requires subject-matter teachers to be knowledgeable about discipline-specific language and classroom language use and to incorporate language objectives that are responsive to English language development in the lesson. Integrating modified language into content instruction is also important. Modified language refers to the varied ways of making discipline-specific vocabulary comprehensible for English language learners. A social studies teacher can, for example, provide a glossary of key words used in the lesson, and a chemistry teacher can use gestures, simplified descriptions, and drawings to communicate the meaning of specific concepts.

Our mainstream subject-matter classes are becoming increasingly linguistically and culturally diverse. It is imperative that subject-matter teachers sensitize their instruction to English language learners' backgrounds and needs and teach subject-matter knowledge through language. EL

[1]Names used in this article are pseudonyms.

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Integrating language into content instruction requires teachers to be knowledgeable about discipline-specific language.

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