

Contemporary Mathematics in Context *Meets Needs of ELL and LEP Students*

By Bill Bokesch

I teach in the Sweetwater Union High School District in National City, California. The district includes 10 high schools and 10 middle/junior high schools in the southwesternmost area in the United States. For the past two school years, all the teachers have been taking a 45-hour professional development course called “Specially Designed Academic Instruction in English (SDAIE)”. The California legislature requires all California teachers, of every grade level and in all subject areas, to take this course. The importance of this requirement continues to increase as the population of students who are limited English proficient (LEP) students grows. Some SDAIE teaching methods include the use of real objects, manipulatives, visuals, graphics organizers, and planned opportunities for interaction among all individuals in the classroom. SDAIE methods are for LEP students assigned to the core instructional classes, and are not remedial instruction, English as a second language (ESL) instruction, or bilingual instruction. The methods do not involve tracking, or provide watered-down content. As one of the original field-test teachers of Core-Plus Mathematics Project materials, I feel that the curriculum, *Contemporary Mathematics in Context*, already incorporates many methodologies similar to those emphasized in SDAIE. These methodologies benefit all students in core content area classes, including those whose first language is not English. The following are some strategies I use to teach mathematics to students in my *Contemporary Mathematics in Context* class. These strategies enhance mathematics learning for all of my students.

- Vary the settings in which students learn. Like SDAIE, *Contemporary Mathematics in Context* provides opportunities for students to learn in a variety of settings other than the traditional classroom setting of straight rows and rigid, one-way teacher delivery of material. In my classroom, the setting depends on the activity. For tests and quizzes, the classroom looks like the traditional classroom. For Investigations or projects, the class may be divided into groups of two, three, or four, depending on the assignment. Except for times when the class is acting as one group or taking an exam, the classroom environment is much like a workplace where the employees are working toward a goal. They are talking about the problem, checking with other groups, or asking me questions.

- Call on students' existing knowledge, observations, and experience.

In each *Contemporary Mathematics in Context* lesson, students discuss a familiar situation as a launching point into new mathematical concepts they are about to experience. Often, this involves talking about movies they have seen, books they have read, lessons they have learned in other classes, places they have been, or jobs their relatives have. The “Think About This Situation” of a *Contemporary Mathematics in Context* lesson allows students to have informal social interaction during mathematics class so they can practice their language skills and make connections between their experience, real-world situations, and mathematical concepts.

- Make the most of recurring problems and mathematical experiences.

In *Contemporary Mathematics in Context*, students may encounter problems, such as finding rates of change, in increasingly deep and complex forms throughout their time in the curriculum. The familiarity with the problems allows LEP and English language learner (ELL) students, as well as other students, to draw on their past learning experiences to develop their understanding of mathematics concepts over time. Students build their knowledge and confidence in solving and discussing problems at increasing levels of difficulty.

Like SDAIE teaching methodologies, CMIC emphasizes the idea that students retain more by doing and discussing as compared to just watching and listening.

- Require students to learn through hands-on investigation.

I am currently teaching the field test of *Contemporary Mathematics in Context Course 4*. Students at this level use a nautical chart with 360-degree protractors and plot courses as I did while serving in the U.S. Navy. As in the Navy, students solve problems by working together, questioning each other, and trying different options until they reach the correct solution. Students work with authentic materials, tools, and problems in a collaborative environment. Hands-on investigation is especially appropriate for LEP and ELL students because they practice and develop their language skills through contact with concrete materials and tools as well as peer interaction. Like SDAIE teaching methodologies, *Contemporary Mathematics in Context* emphasizes the idea that students retain more by doing and discussing as compared to just watching and listening.



- Emphasize how students' mathematics and language skills will benefit them in the future.

I address two key questions with my students throughout the year: "What is 'the real world'?" and "What do businesspeople want from graduates?" In answering the latter question, my students and I have found that employers want graduates who think for themselves and are able to work with others toward the mission and goals of their companies. I try to convey to them that their bilingual ability coupled with their ability to read and understand the mathematical concepts presented in *Contemporary Mathematics in Context* will make them marketable as they begin their careers, especially after college. During Career Day at our school, the human resources administrator from an international satellite communications company reinforced the idea that mathematics and language skills are crucial to success in the world of work.

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- Work as a whole group to understand new concepts and vocabulary.

I asked students in my *Contemporary Mathematics in Context* class (75 percent of whom are ELL students) what they thought about the reading required in the course. Most responded that by working as a class on the "Think About This Situation" section and the first two or three exercises in each Investigation, they could gain understanding of the concepts and vocabulary required to finish the Investigation as well as the related "MORE" questions assigned for homework. When the class works as group, students can benefit from asking questions and hearing other's ideas before they work in smaller groups or individually.

- Integrate technology.

An added bonus in *Contemporary Mathematics in Context* is the full integration of technology throughout the curriculum. In the *CMIC* classroom, it appears that technology bridges language-related and cultural barriers in mathematics problem-solving because it aids in visualizing problems and expressing solutions. For example, one ELL student in my class this year can describe the derivative of a function as a rate of change at a point and visually show it using the graphics calculator. She can succeed in more advanced mathematics because she has an additional tool with which to demonstrate her knowledge and abilities, regardless of her current English language abilities. After four years of observing students using the graphics calculator on a daily basis, my impression is that they look at the graphics calculator like many people of older gen-

erations look at a pencil: it is one of several tools they can use to approach a problem.



During Investigations and projects, students collaborate in small groups with teacher guidance.

- Conclusion

Literacy in all content areas is a major goal of my school and district for all students, including those whose first language is not English. Required professional development courses like SDAIE encourage teaching strategies that will help LEP and ELL students reach this goal. The *Contemporary Mathematics in Context* curriculum incorporates many of the same teaching strategies taught in the professional development courses. By using appropriate settings, discussion, investigation, and tools, I help students in my *Contemporary Mathematics in Context* class learn mathematics in a way that strengthens their language skills and allows them to build on their existing mathematics knowledge. I sincerely believe that *Contemporary Mathematics in Context* provides valuable language learning in a first-rate mathematics curriculum.

Bill Bokesch has been teaching Contemporary Mathematics in Context for five years. He has field-tested Courses 1, 2, 3, and 4 and piloted Course 4. Bokesch is in his eighth year of teaching after retiring as a Captain from 25 years of service in the United States Navy. He is currently President of the Greater San Diego Mathematics Council.