

## Improving Teaching with Theory and Research–Part 2

"Good morning, Dr. Ramirez," Karen says to Cedro Ramirez as she walks into the classroom. "I have a problem with my students, and I wonder if you might help me."

"Of course, I'll be happy to try," Cedro responds. "Let's talk about it after class."

At the end of the day, Karen explains the problem, describing it in much the same way as she had described it to Ken in their conversation the day before. "What can I do?" she asks.

"Good question," Cedro responds. "Yes, I think I can help you. . . . This actually relates to theories of cognitive development—the development of students' thinking—which is our topic for the next class. . . . You're describing a problem that is common in students."

"Here are some of the issues. First, cognitive development theory tells us that students need concrete and real-world experiences in order to learn to think in the abstract. The concept *density* is quite abstract, and even though your students are eighth-graders, the concept won't make sense to them if they haven't had some concrete experiences with the concept. Since it doesn't make sense, they simply try to memorize the formula and solve problems with it, even though the formula doesn't really make sense to them either."

"So, what do I do?"

"Very simply, you must provide the experiences for them. . . . So, what, for example, can you show your students, or what can you have them do, that will concretely illustrate the concept *density* in such a way that it will make sense to them."

He continues, "Studies showing that students' understanding dramatically increases when they work with clear, concrete examples and have plenty of class discussion with them have been some of the most influential in my career."

"In fact, in one study researchers had one group of teachers carefully explain a topic, and they had another group show a series of examples and asked the students to look for patterns in the examples. The students taught by the second group of teachers showed much deeper understanding. . . . You're going to hear a lot about that as our class goes along." Cedro laughs.

"Thank you so much, Dr. Ramirez." Karen smiles as she leaves. "You've been very helpful. I'll let you know how I make out when we have our next class."