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Preparing Teachers to Help English-Language Learners Understand Science and Mathematics

Acting on Faith and Knowledge



“It’s about believing that English learners can learn math and science. And they can learn if we use certain strategies...and don’t have a deficit view on children’s learning. There is a local context; we need to support and empower each other to make a difference.”
—Elizabeth Franklin

Imagine you are a new teacher faced with a classroom of curious, energetic children. Your children are intrigued with many aspects of science — how animals communicate, what causes plants to grow, how mountains are formed, and the like. They are also interested in mathematics — in counting, adding and subtracting, and comparing the sizes and shapes of objects.

As you gain experience in your teaching, you find that you are fairly successful in capitalizing on children’s inquisitive nature and in fostering their achievement — but with some children more than others. You begin to focus on children who are English-language learners. English-language learners come to your classroom with relevant ideas about science, basic skills in mathematics, and an eagerness to find out more. Yet they do not fully understand your lessons.

You wonder: How can you reach these children? How can you give them the same opportunities experienced by other children?

A team at the UNC has begun to answer these questions. The group is comprised of Drs. Elizabeth Franklin (Professor in Hispanic Studies), Lori Reinsvold (Director of Technology at the Mathematics and Science Teaching Institute), Jennifer Harding-Dekam (Assistant Professor in Teacher Education), Youngjin Song (Assistant Professor in Chemistry and Biochemistry), and Teresa Higgins (Assistant Professor in Biological Sciences). These educators are partnering with teachers and school leaders in Archuleta (Denver Public Schools), Dunn (Poudre School District), and Centennial and Dos Rios Elementary Schools (Greeley-Evans Weld County School District 6). Last year, these schools collectively enrolled more than 1,000 English-language learners.

According to Dr. Franklin, executive director of the Mathematics and Science Teaching for English Learners (MAST-EL) project, one important answer is that you must have a strong faith in the abilities of English learners. “It’s about believing that English-language learners can learn math and science. It’s about empowerment.”

There are plenty of children to empower. The population of English language learners in the state of Colorado has increased 260 percent in the past 10 years (Medina, 2010). Yet teachers do not always feel adequately prepared to meet the needs of these children, either generally or in the specific areas of science or mathematics. Nearly half of all in-service teachers have English-language learners in their classroom, but teachers receive an average of only four hours of training in English as a Second Language strategies (National Research Council, 2010). Professional development that is available tends to focus broadly on methods for increasing achievement scores and does not provide teachers with strategies for daily classroom teaching, specifically in math and science.

Dr. Franklin sees MAST-EL as an opportunity to collaborate with other experts and move forward together to prepare well-informed teachers who can make a difference in the achievement of English-language learners. The program will prepare 30 pre-service teachers to deliver high-quality mathematics and science instruction by giving them rich experiences working with kindergarten through fifth-grade English-language learners in the four elementary schools. The pre-service teachers will each complete UNC’s English as a Second Language (ESL) endorsement, which is a unique elective program offered at UNC for prospective elementary, secondary, and K-12 teachers.

MAST-EL is funded by the National Professional Development Program of the U.S. Department of Education. Among other things, the project funds half-time instructional coaches to train teachers in the participating elementary schools to become exemplary educators of mathematics and science for English-language learners. The grant also provides the opportunity for UNC faculty and students to build long-term relationships with administrators and teachers at the four partner schools.

“It’s about believing that English-language learners can learn math and science,” Dr. Franklin said. “And they can learn if we use certain strategies and don’t have a deficit view on children’s learning. There is a local context; we need to support and empower each other to make a difference.”

She also strongly encourages other faculty to spend some time in Colorado schools to experience the changing demographics. Dr. Franklin stresses the importance of learning about the cultural backgrounds of children and their families and sees an opportunity for UNC to be a leader in related education and research.

References: Medina, B. (2010). Linguistically diverse learners in Colorado: A State of the state. Denver, CO: English Language Acquisition Unit, Colorado Department of Education. National Research Council. (2010). Preparing teachers: Building evidence for sound policy. Washington, D.C.: National Academies Press.

