Investing in K-12 science education

Only one-fourth of Arizona's nearly 300 physics teachers have a degree in physics or physics education. Half of the chemistry teachers don't have a degree in chemistry. The vast majority of 9th grade physical science teachers are out-of-field; typically their major was biology or a non-science subject.

To address this complexity, ***Arizona State University*** has developed programs to help train teachers across the science curriculum so they can meet the needs of the 21st century science student.

The ***Master of Natural Science (MNS)*** degree and the ***Modeling Instruction Program*** are two innovative and successful approaches to science teacher development. Most students in the programs are current teachers looking to expand or deepen their effectiveness in the classroom.

Because they attract both resident and non-resident students, the MNS and Modeling Instruction programs have had a real and substantive impact on science education here at home and throughout the United States. On the reverse side, see what teachers have to say about the quality of these programs.

To learn more about science teacher development at ASU, please visit our web pages at ***http://physics.asu.edu/graduate/mns/overview*** and ***http://modeling.asu.edu/***.

ASU College of Liberal Arts & Sciences

ARIZONA STATE UNIVERSITY

Investing in K-12 science education

"Districts today pay $8 billion every year to teachers because they have a master's degree, even though there's little evidence that teachers with master's degrees improve education -- with the exception of those who have master's degrees in math and science"

- Arne Duncan, U.S. Secretary of Education

Source: Zwang, J. (2011, January) Duncan: Technology can help cut education costs. *eSchool News*, 14 (1), 18.

From national reviewers…

" The MNS program distinguishes itself by attracting a motivated group of learners, providing useful and challenging courses, modeling the type of student-centered instruction promoted by the program's developers, supporting student-to-student and student-to-instructor collaboration, and following up on the impact of the program as teachers return to their high school classrooms. Simply put, the MNS machinery is doing what it claims."

- National Science Foundation internal grant evaluator

"One of the important ways that ASU is currently elevating science education in Arizona is its unique Master of Natural Science (MNS) program for in-service teachers. There appears to be no comparable program at any other university in the United States, and it stands as an exemplary model of how physics departments can improve high school physics education."

- North Central Accreditation Academic Program Review Committee

From program participants…

"I've doubled the population of students registering for the general physics class at my school. The reason I've been able to do this is because of what I've learned through the modeling instruction program at ASU, both in terms of knowledge and superior teaching practices. It is by far the best science methodology out there."

"I feel very much indebted to the Modeling curriculum for equipping me with sound pedagogical techniques and content knowledge."

"Everything offered has been valuable to me, and relevant to what I do...I have learned to be a better physics teacher, learner and thinker."

"Courses have broadened my own knowledge of physics...the integrated courses allow me to work with my students in ways that make them more successful in mathematics and other sciences."

"The MNS physics degree is more valuable not only in my physics classes, but my chemistry classes as well. The courses not only deepened my understanding, but I finally "saw" how much physics impacts the understanding of chemistry."

"I finished the MNS degree last summer and am very pleased with my choice. I am a better science teacher!"

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