UAlbany Researchers Reveal Reasons Why Some Schools Excel at Science Instruction

ALBANY, N.Y. (November 10, 2009) -- Researchers at the University at Albany’s School of Education and the Just for the Kids-NY project have found that middle schools demonstrating five essential elements of instruction produce students who consistently do well in science.

The five elements identified in the UAlbany study are:

- All students are given a fair chance to experience how enjoyable and relevant science can be through open enrollment in higher level classes and/or heterogeneous grouping.
- Continual curriculum review and communication among all science educators across all grade levels ensure students learn the fundamentals.
- Teachers and administrators focus on what needs to be learned by using a variety of data to assess student progress.
- Teachers seek ways to collaborate across the curriculum so that students build scientific literacy and fluency.
- Districts hire teachers who not only fit their culture and have scientific knowledge but also want to teach students at the middle level.

Students who experience these elements outperform their peers on New York State Science Assessments and are not only prepared to take higher-level science in high school but are interested in doing so.

To conduct the study, Visiting Assistant Professor Kristen Campbell Wilcox and Distinguished Professor Arthur Applebee selected two groups of schools that are similar in all aspects other than their results on the New York State Intermediate-Level (Grade 8) Science Assessment. In 40 percent of the schools, student poverty levels exceed the state average as measured by free and reduced-price lunch rates. Per pupil expenditures in each school cluster near the state average, and no schools have competitive admissions policies. However, in one group of schools, students consistently scored at or near the mean on the science exam during the years 2006, 2007, and 2008; in the other group, students consistently scored at least one standard deviation higher on the same exam over the same years. Teams of researchers made two-day visits to schools in both groups, interviewing teachers and administrators and observing science classrooms. They then compared the data collected across all sites to identify the elements that marked the difference between the two groups overall. Each element was present in at least half the higher performers and absent in at least half the average performers.
In addition, according to administrators in the higher-performing schools, their students are not only prepared to take higher-level science in high school but also sign up to do so. According to economists, these dual goals -- students both interested in science and prepared to continue their study -- are key to a technologically sophisticated future society.

Both the report and a summary can be ordered or downloaded from www.albany.edu/aire/kids/middleschoolscience.html.

This study is the fourth in which the researchers identified differences between higher- and average-performing schools. Previous studies examined elementary, middle, and high schools generally. Reports of findings and related materials are available from www.albany.edu/aire/kids or knowyourschoolsny.org.

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