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**NAEP FINDINGS CONFIRM THAT DEEP CONCEPTUAL LEARNING IS ESSENTIAL
TO STUDENTS' FUTURE SCIENCE SUCCESS**

*Adaptive Curriculum presents the case for incorporating interactive activities,
real-world scenarios and virtual manipulatives into the science curriculum*

Scottsdale, Ariz. — Sept. 12, 2012 — This past May the U.S. Department of Education released its “Condition of Education” report, which used 1990-2009 figures to reveal a trend of more high school students enrolling in science classes. However, despite students’ increased interest in science, only 21 percent of high school seniors performed at or above the proficient level and just 1 percent scored at the advanced level on the 2009 NAEP science test.

“When less than a quarter of high school seniors achieve proficiency in the sciences they’ve been studying, it’s evidence of trouble instilling a real understanding of core ideas,” stated Peter Rillero, Ph.D., an associate professor of science education at Mary Lou Fulton Teachers College, Arizona State University (ASU). “The problem is traditional instruction favors breadth over depth, leading to a lack of deep conceptual learning.”

According to Rillero, deep conceptual learning is characterized by having students link new concepts to prior knowledge, connect abstract ideas to real-world situations or construct their own knowledge. “Deep conceptual understanding leads to improved retention and application of information,” he said. “In fact, the upcoming next generation science standards emphasize depth over breadth to help students move from simple memorization to deep, meaningful learning.”

Rillero’s remarks concerning deep conceptual learning are supported by a June 20 [U.S. News & World Report](#) article that revealed that while 75 percent of the seniors could do the NAEP science test’s straightforward experiments, only 25 percent were successful in the more complicated experiments, indicating a lack of deep understanding. Furthermore, while a June 21 article from [Education Week](#) reported that elementary and middle school students demonstrated the

same lack of deep understanding in the assessment, a 2011 [NAEP](#) report for eighth graders showed that students who did hands-on projects every day or almost every day scored higher on average than students who did hands-on projects in class less frequently. That 2011 finding reflects Rillero's stance on the value of making scientific concepts "come alive" through real-world situations.

However, many teachers and administrators report that time constraints, standardized testing, student attitudes, and a lack of resources make it challenging to integrate hands-on experiments and similar instructional methods. Rillero has co-authored a white paper titled "[Deep Conceptual Learning in Science and Mathematics](#)," in which he recommends creating virtual experiences and mentions an example from [Adaptive Curriculum's](#) (AC) web-based active learning environment. Designed for grades 6-12, Adaptive Curriculum's math and science solutions integrate real-world scenarios, cutting-edge graphics, interactive simulations, and 3D models to help students improve their concept mastery and strengthen their problem-solving skills.

"Adaptive Curriculum solutions were developed in partnership with faculty and leaders at ASU and ASU's Technology Based Learning and Research Center," said Jim Bowler, CEO of Adaptive Curriculum. "Their pedagogical research, multi-disciplinary expertise and content collaboration ensure improved conceptual understanding and critical thinking through multimedia-rich experiences and active learning which, in turn, increases students' math and science scores."

Besteiro Middle School in Brownsville, Texas provides a striking example of improved test scores achieved through the Adaptive Curriculum learning environment. During the 2006-07 school year, the school began using [AC Science](#) to help students make real-life connections to science and develop a deeper understanding of core concepts and skills. Teachers integrated the program's instructional units, called Activity Objects, into whole group instruction using interactive whiteboards. Every student also had access to the program in the computer lab and at home. In 2011, the school's science scores were the highest it had ever achieved, with 81 percent of students meeting the standards in science, up from 61 percent in 2008, on the Texas Assessment of Knowledge and Skills (TAKS).

"For students, Adaptive Curriculum's real-world scenarios, realistic visualizations, interactive simulations, and 3-D models make abstract concepts easier to understand. Students like that the activities are self-paced, so they can repeat something as many times as needed to ensure understanding," said teacher Noe Granado. "We have also found that integrating technology into science has helped us to become facilitators of student learning. By using real-world connections to develop students' conceptual understanding, rather than learning by rote, we have motivated students to take an active role in their learning."

About Adaptive Curriculum

Designed for grades 6-12, Adaptive Curriculum's web-based math and science solutions are used by more than 3 million students in the United States, Europe and Asia.

Adaptive Curriculum is part of Sebit Inc., a global eLearning company and leader in digital curriculum innovation. For more information please call 1-888-999-9319 or visit www.adaptivecurriculum.com.

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