FOR IMMEDIATE RELEASE

ASU's TECHNOLOGY BASED LEARNING AND RESEARCH CENTER RELEASES PAPER ON DEEP CONCEPTUAL LEARNING METHODS IN MATH AND SCIENCE

Concept mastery solutions such as Adaptive Curriculum support deep conceptual learning methods, helping students to build a deep understanding of core concepts and skills

Scottsdale, Ariz. — Feb. 7, 2012 — Informed by top performing countries around the world, the Common Core standards in math and the soon-to-be-released next generation science standards raise the bar with national learning expectations for K-12 students. With an emphasis on depth over breadth, the standards are causing math and science educators to rethink current practices by which many students learn only enough to get by on the next test or state assessment. To help educators turn these skim-the-surface students into deep conceptual learners, Arizona State University's (ASU) Technology Based Learning and Research (TBLR) center today releases a white paper titled, "Deep Conceptual Learning in Science and Mathematics."

In the paper, co-authors Peter Rillero, Ph.D. and Helen Padgett, Ph.D. describe "deep conceptual learning methods" and how these methods can help students meet more rigorous standards in math and science. Rillero is an associate professor of science education at Mary Lou Fulton Teachers College at ASU. Padgett is the TBLR Director of Professional Development and Research at Mary Lou Fulton Teachers College at ASU.

“While it’s clear that deep conceptual learning is a desired outcome of the Common Core standards, just asking students to learn deeply isn’t enough,” said Rillero. “Educators need practical, proven methods to help students to make connections between concepts and real world situations. Deep conceptual learning methods — such as discovery learning, multiple representations, analogies, and challenge based learning — help students move from simple memorization to deep, meaningful learning.”

Learning Through Discovery

Discovery learning, for example, creates experiences for learners to join concepts together. This learning can occur with physical manipulatives as well as virtual experiences. In the paper, the Rillero and Padgett describe a virtual learning experience that incorporates the use of Adaptive Curriculum, a web-based concept mastery solution that strengthens math and science performance by helping students build a deep understanding of core concepts and skills. According to the authors, “virtual experiences can allow more experiences to be done in the same time and might allow experiences that are too difficult, dangerous, or expensive to do in class.”

They cite an Adaptive Curriculum instructional unit on “Conservation of Mass,” in which students measure the mass of reactants, burn them, and then measure the mass of the gas and residue remaining. Each time the mass of the reactants is equal to the mass of the products. Starting with their observations, students are led to the conclusion that mass is conserved in the chemical reactions. “Not only is the content learned in a deep and memorable way, learners develop inquiry skills; they learn what is so often forgotten in science lectures and textbooks — how we know what we know,” the authors state.

The white paper also describes how methods such as multiple representations, analogies, and challenge based learning help students to connect new concepts to concepts already mastered, link concepts to real world situations, and construct their own knowledge.

“Deep conceptual learning is an important and laudable goal in K-12 education,” said Padgett. “In subjects such as math and science, which are crucial to ensuring students are prepared to succeed in our global economy, we must move beyond rote memorization and emphasize conceptual understanding in addition to procedural skill. This way, we can make sure students are deeply learning the critical information they need to succeed in elementary and secondary school, as well as college and careers.”

About Technology Based Learning and Research

As an integral part of Arizona State University’s innovation and research initiatives, TBLR focuses on research and large-scale delivery of educational materials as well as technology training and integration using computers and other information and communication technologies. For more information, please visit http://tblr.asu.edu.

About Adaptive Curriculum

Designed for grades 6-12, Adaptive Curriculum’s web-based math and science solutions are used by more than 2 million students in the United States, Europe and Asia. Worldwide experts in math, science and online learning theory contribute to the content and design of the interactive

activities to deliver effective instruction that improves performance on high-stakes tests, and enhances college and career readiness.

Headquartered in Scottsdale, Arizona in the Arizona State University (ASU) SkySong Center for Innovation, Technology and Imagination, 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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