

Augmented reality takes hold in K-12 Classroom

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A small but growing number of schools across the nation are turning classroom lessons into engaging experiences with augmented reality (AR), a technology that overlays digital information on top of the real world surroundings as viewed through a smart phone or other handheld, GPS enabled device.

AR differs from virtual reality in that while virtual reality aims to replace a person's perceptions of the world with an artificial world, augmented reality enhances a person's perceptions of his or her surroundings.

The Augmented Reality Development Lab (ARDL), from virtual reality developer Digital Tech Frontier, lets users display relevant information at the appropriate time and location during an AR experience, which results in virtual 3D objects appearing in the real world.

Students and teachers look through a viewing device or at a monitor to see virtual objects such as planets, volcanoes, the human heart, or dinosaurs embedded within their real world environment and they can interact with and manipulate those objects to receive associated information.

Debra Sloan, an educator with forest heights Middle School's Eagle Environmental and Spatial Technology (EAST) program in Little Rock, Ark., uses the ARDL in the schools project based service learning class. Students and teachers also can network and share the modules they've created with other students and schools.

"ARDL is such a nice direction to go...in incorporating technology in the classroom," Sloan said, adding that students "love more than just sitting and watching things happen." Ed-tech advocates say AR can help students with spatial and temporal concepts, can facilitate interaction, and appeals to kinesthetic learners.

"The nice thing about augmented reality is that it can bring anything to life," said Scott Jochim, creative director at Digital Tech Frontier. "All you need is a simple Google SketchUp model, or a more complex 3D Max model if you so desire. Attach simple attributes, and presto-your augmented reality educational experience." (3ds Max is three-dimensional modeling and rendering software from Autodesk; SketchUp is a free 3D modeling program from Google.)

Jochim said the ARDL was created in part to respond to the challenge that lecture based learning does not affect students in the same way that technology-infused learning experiences can.

The ARDL interface has prebuilt education modules for science, math, art, and social studies, as well as a module builder for building new software. The system lets students and teachers build programs, examples, and curriculum using augmented reality. "AR raises the level of interaction for the students," Sloan said. Students in the EAST program have created a virtual tour of the Clinton Library and are working to integrate AR technology into the tour. Also in the works is a map of the school for new students and local hospital tour.



Demonstrating a working model of a human heart with the ARDL™ from Digital Tech Frontier.

Using Google SketchUp or Google's 3D Warehouse—a collection of free 3D models that users are adding to daily—educators can create or find 3D images of any item for classroom use and manipulation.

The ARDL retails for \$2,999 which includes a 5-seat license. Jochim said additional fee based curriculum tools will be available soon as well, but purchasing those will not be necessary to operate the ARDL.

In April, Qualcomm's Wireless Reach Initiative, together with San Diego's School in the Park program and the San Diego Museum of Art, launched a project that gives San Diego elementary school students the opportunity to learn about art with AR.

"In its simplest form, augmented reality is an effort to merge physical and virtual worlds," said Patrick O'Shea, director of the Handheld Augmented Reality Project (HARP) at Harvard University. O'Shea collaborated on the School in the Park program with San Diego officials.

The program lets students explore Asian art and folktales using AR experiences to enhance learning.

Students use the Samsung Moment, a Google Android smart phone, along with Layar an AR browser that overlays data using the smart phone as a view finder. As a student approaches a sculpture or another work of art, information might pop up on the student's smart phone that explains the history behind that piece, for example.

"Of course, there's a learning curve that goes along with any new technology, but the thing that's really promising about this type of experience is how engaging it is for students," O'Shea said. "Anything that engages students is a net benefit in the long run."

For more information:

Qualcomm's Wireless Reach Initiative
http://www.qualcomm.com/citizenship/wireless_reach/index.html

Handheld Augmented Reality Project
<http://isites.harvard.edu/icb/icb.do?keyword=harp>

Digital Tech Frontier, LLC

<http://www.ARDevelopmentLab.com>