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Skyping Science

Cloud video conferencing tools bring cutting edge science to rural schools. Rural schools might have a low student-teacher ratio that urban educators envy, but they usually have fewer resources backing the educational process. One way in which some are expanding the depth and breadth of their resources is by utilizing cloud computing to tap the expertise readily found in higher education.

- By Margo Pierce
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Rural schools might have a low student-teacher ratio that urban educators envy, but they usually have fewer resources backing the educational process (See "Keeping Rural Schools Up to Full Speed" in the October issue of *T.H.E. Journal*). One way in which some are expanding the depth and breadth of their resources is by utilizing cloud computing to tap the expertise readily found in higher education, in particular at **Vanderbilt University** in Nashville, TN.

Using a variety of cloud video conferencing products, 10 schools in Arkansas, Maine, and Tennessee participate in STEM labs sent directly into the school by scientists at Vanderbilt. Each school works with the scientists to prepare individual lessons to match their curriculum and schedules the once-a-week sessions for a semester or a school year. These are incorporated into regularly scheduled class periods or after-school enrichment programs.

"What it seems that schools lack, and especially rural public schools, is hands-on, inquiry-based science," said Dr. Julie Hudson, assistant vice chancellor for health affairs at Vanderbilt University. "There is a great need. There's a defined need. What would one do to reach those students with this rich, deep resource of content and experiential expertise? It has to be through technology."

Plugging In

Hudson, who is also a co-founder of the **Aspirnaut program**, the 501(c)(3) organization that administrates the STEM labs, said much of the technology needed was already in place because most schools have a **PolyCom** or **Tandberg** video conferencing system. For those that don't, **Skype** and **Face Time** work equally well.

The school receiving the programming provides its own high-speed internet connection, computer, and large screen monitor or projector that puts the scientists in the front of the room. If a school doesn't have the computer, Aspirnaut provides one. Another essential element is the elementary or high school teacher who anchors the program at each participating school, according to Scott Shirey, executive director of **KIPP**, a charter school in the Delta Public Schools in Helena-West Helena, AR.

"Start with a strong teacher," he said. "I don't think this program should be a supplement for a weaker teacher or a replacement --it's correlated perfectly with the stronger teacher who's going to take the extra effort."

During the 2011-2012 school year, KIPP is expanding its participation with Aspirnaut, adding a sixth-grade and third-grade class to its existing pilot class. But, Shirey said, he'd like to see the entire school involved.

"The experience has been positive for both our teachers and our students," he said. "The No. 1 reason why is exposure and access. We are located in a small, rural community where we wouldn't have access to that type of lab equipment."

Unexpected Benefits

The Vanderbilt staff prepares customized lessons around the defined objectives, prepares and sends lab kits (provided free of charge, if necessary), and teaches the classes each week. The scientists guide students through experiments, and kids get to ask questions in real time. This one-on-one attention is akin to having a guest lecturer, albeit via cyber space.

That immediate access is actually the driving force behind the "beaming science labs," according to Hudson. Surveys of teachers and students in the program regularly cite the new information as a benefit. But there are other positive results Hudson didn't expect.

"The students love the language, which is not something I would have really thought of," she says. "The word 'dendrite': Where else would you find that word?"

Teachers also applaud the encouragement and personal stories the Vanderbilt professors share as a way to illustrate how STEM subjects are applicable to everyday life. This opens students' minds to the idea of higher education and to careers they might never have considered. Individual achievement, the ultimate goal of any curriculum, is why the Aspirnaut program strives to accommodate the unique needs of each school and teacher.

In one pilot project last fall, a seventh- and eighth-grade teacher asked Hudson to teach a class via videoconference to her seventh grade, opting to teach the same course to her eighth-grade class herself. The teacher also administered both pre- and post-content exams that she uses in her science courses.

Ultimately, the students who participated in the STEM lab scored an average of 90 percent on the end-of-unit test. Those who took the class with their regular teacher scored an average of 80 percent.

At the end of the unit, Hudson recalled the teacher remarking about the seventh-graders, "They're just different when they're with you."

While all of this comes courtesy of cloud computing, it's the real-world activities that make the science labs most meaningful. Tom Leonard, school leader at the **Beech Hill School** in Otis, ME, is excited about the real-world experience his students will be getting, thanks to the school's participation in a STEM pilot during the previous school year.

This year, Leonard's school will get an opportunity to help conduct some real research with Vanderbilt, which is leading a project on microscopic organisms called water bears. Leonard's school will collect them in Maine and ship them to Nashville for diabetes research.

"The kids love it," Leonard said. "And it's not soft science; it's really important hard stuff."

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