Strategies to Put Instruction Ahead of Technology

By Eric Jones

One-to-one computing, laptop learning, technology immersion: such initiatives are gaining momentum—and sparking excitement and controversy—in middle level and high schools, but the key to their success is more than cutting-edge technology.

Henrico County Public Schools, a pioneer in educational technology in Virginia, launched a one-to-one computing initiative in 2001. But the professional development approach that supported the initiative was driven more by the products than by instructional needs, and as a result, the district did not achieve all the results it wanted for teachers or students.

Lessons Learned

When the district decided to switch to a new computer platform and implement Dell notebook computers in all its high schools in the 2004–05 school year, it initiated a new professional development program that acknowledged the lessons learned from the past and defined a clear vision for the future. One lesson resulted in a fundamental shift in the program: all professional development must be approached from an instructional rather than a technical viewpoint.

Although the professional development program had been driven by the need for teachers to learn the new hardware and software, the district was ready to take the next step. Rather than simply learning the basics of how to use a technology tool, teachers must learn how to use the tool to improve teaching and learning in their classrooms. Training is embedded in instruction, not isolated from it, and is driven by the skills that teachers need to use the technology in the classroom, not by the technology itself.

Creating a Vision

As the district prepared to roll out the new notebook computers to all of the high schools, it worked with Pearson Achievement Solutions to create a clear vision for the program. Educators were encouraged to ask themselves, What do we want our classrooms to look

PREVIEW

Professional development for educational technology must be driven by instructional strategy, not by the product or technical proficiency.

Strategies that help teachers continue learning, such as study groups and a train-the-trainer model, are the most successful.

Instructional supervision is aided by a technology progression chart that helps teachers see where they need to go and understand how to get there.

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A school-based trainer provides hands-on support for using instructional technology.

like with this technology? What do we want our teachers and students to accomplish with this technology? How will we get there? What results do we want to see? Although this process took time, it was necessary to ensure that the technology implementation met the district's goals and expectations.

School leaders also used data to effectively plan professional development. They looked at technology-usage data as well as survey responses from teachers, students, and parents about their attitudes about the initiative and perceived benefits and challenges. One of the most important findings from the data was that the on-campus technology trainer assigned to each school played a vital role in helping teachers integrate technology into their daily instruction.

Training the Trainers

Each of the technology trainers was an outstanding classroom teacher who had moved into the trainer role. They had spent four years learning by doing—on their own. As preparations were made to launch the new professional development program, district leaders realized that the trainers had never participated in a structured professional development program that was designed for them. In the past, they had simply received the same training as all the other teachers. To make up for this shortfall, the trainers attended intensive, three-day professional development sessions during each month that summer so they would be prepared before the new computers were introduced to all the teachers.

Another big piece of the professional development program was ensuring that the trainers understood the process for professional development. The district wanted to move away from one-shot professional development that provided good content but no follow-up. The consultant modeled the process with the trainers throughout the school year, and the trainers began to implement it in their schools. Understanding and implementing the process was a step that had previously been left out of the professional development model, and it turned out to be something that the trainers found very beneficial.

With the improved "train the trainer" model, the district was able to instill its vision for technology in each high school and provide each campus with an instructional expert to train teachers and provide follow-up and support throughout the school year. Having a dedicated staff member—one who is an instructional leader, rather than a technician—within each school is invaluable because teachers know they have a resource they can call upon at any time.

Ongoing Training

During their first experience with laptop learning, district leaders learned the importance of providing ongoing training and support for teachers. It is more effective to incrementally build teachers' skills through ongoing workshops and coaching to help them become comfortable with technology than to overwhelm them with everything at once.

Following their own training, the campus-based trainers and the professional development provider conducted three days of training to teach the high school teachers the basics of how to operate the new computers and technology tools. But instead of simply showing teachers how to use a spreadsheet program or curriculum software by following a tutorial, the trainers showed teachers how to use the program in an actual class lesson. For example, instead of demonstrating how to use an algebra software program by leading teachers through the tutorial, the trainers taped one of the outstanding math teachers using the software to teach an actual lesson in his classroom. The tape was used to spark interest among the teachers so they could look at the example and say, "Wow, that's a great idea! I never thought about using the software in that way before. This is something I need to learn and use in my classroom."

The district then set up a training schedule at each high school. Throughout the school year, the consultant and I followed up with the campus-based trainers and visited each school to observe training and the implementation of technology in teachers' classrooms. The district provided three days of training each month to help teachers further develop their knowledge and skills and implement practical strategies and activities to fully integrate a variety of technology tools—including notebook computers, e-mail, productivity tools, cur-

riculum software, and presentation tools—into their daily instruction.

Study groups at each high school enabled small groups of teachers to explore technology, curriculum, instruction, and professional development issues in depth and helped to improve interaction and collaboration among teachers. To further increase collaboration, exemplary lesson plans created by the curriculum specialists and teachers are stored in an online reference library, which allows these materials to be easily accessed and shared across the district.

Increasing Accountability

Principals play an important role in integrating technology in each of our schools. Henrico County has developed an array of instructional supervision procedures and classroom observation forms related to technology integration and the effective use of technology in classroom instruction. For example, a technology progression chart was developed to help principals observe teachers in the classroom. Using this chart, principals can place teachers in one of four categories on the basis of how they are integrating technology in instruction: entry, developing, approaching the target, or ideal/target. Within each category, specific indicators provide a consistent set of measures that enable administrators to use common language to deliver feedback to teachers on the skills they must demonstrate to progress to the next level.

For example, in the one-to-one computing initiative, many teachers were using PowerPoint presentations to deliver instruction while students took notes on their computers. Although that is a fine use of technology, the goal is to have teachers move to the next level where they create new learning environments and promote higher order applications of technology. The technology progression chart is an easy-to-use tool to help teachers get to that next level. In addition, it helps principals better respond to teachers' needs and actively work to secure the necessary resources.

Positive Results

To date, the efforts to reshape professional development for the one-to-one computing initiative have had a positive effect on teachers and their instruction as well as on student learning. The increased use of technology has helped ignite excitement in teaching and learning while building students' critical-thinking and problem-solving skills. For example, one geometry teacher uses a variety of technology tools to create exercises in which students are asked to manipulate the shapes and sizes of geometric forms and prove specific theorems. As students change the shape or size of a form, they are asked to explain how such changes affect the theorem. This is not only much easier to do with technology than with pencil and paper but also much more engaging for students.

In other schools, students collaborate to create films in content-area classes. For example, in a science class, a group of students might create a film that illustrates the process of mitosis and then use the film to explain the process to their peers. At the end of the school year, some schools hold film festivals to allow students to share their knowledge and work with a wide audience and gain recognition for the quality of their work.

Henrico County cannot assert a causal relationship between this initiative and increased test scores, but the county's high schools have made substantial gains in the years that we have had a one-to-one environment. On the Virginia state tests, Henrico County high schools have seen a 7.7-point increase in reading, a 17.01-point increase in algebra I, a 49.65-point increase in U.S. and Virginia history, and a 13.25-point increase in geometry.

In addition, the district has conducted large-scale surveys of students, teachers, administrators, and parents. In each of these surveys, all groups have shown overwhelming support for the initiative. Specifically, nearly 90% of teachers said that professional development activities related to e-learning are

HENRICO COUNTY PUBLIC SCHOOLS

Location
Richmond, VA

Number of Schools
66

Enrollment
47,868

Community
Mixed (urban, suburban, rural)

Demographics
4.9% Asian, 35.8% Black, 3.6% Hispanic, 51% White, 4.7% other; 40% free and reduced-price lunch

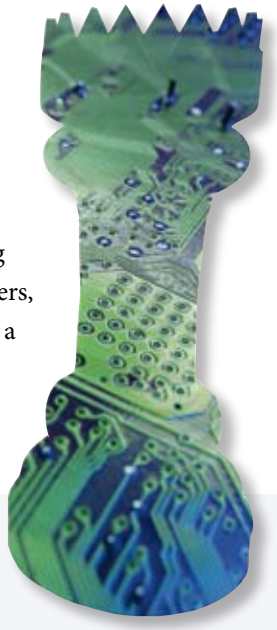
Administrators
138

Faculty
3,622

Staff
3,588

worthwhile. In addition, in a survey last spring, high school teachers reported that they integrated the technology into their instruction more than in previous years and that the professional development was so valuable that they needed more of it to keep current with new technology.

Even after having led the initial one-to-one computing initiative for four years, the county found that it was helpful to have a professional development provider put the focus on what needed to be done. It helped the technology leaders band together and get good at what they were doing very quickly. It was particularly beneficial to have someone who understood technology needs but was not a member of a particular school or district look at things with an objective eye and provide additional guidance and expertise. After learning from its earlier experience, Henrico County now has the tools and training that are necessary to help principals, teachers, and students use technology to truly make a difference in teaching and learning. PL



The Technology Integration Progression Chart

How well is technology used for instruction in your school? Use the detailed progression charts to examine technology integration from a teacher's perspective and then from the student's perspective.

Teachers' Integration of Technology to Support Instruction

Entry	Developing	Approaching	Ideal/Target
ORGANIZATION OF THE LEARNING SPACE			
• No apparent consideration in organizing/arranging the classroom for use of student laptops.	• Teacher is aware of the importance of classroom organization/arrangement to manage student use of technology (unobstructed movement, monitoring student screens, and location of battery charging station)	• Teacher stages room arrangement to best fit instruction.	• Teacher dynamically configures room for instruction and transitions are seamless.
• Teacher does not use (available) projection equipment.	• Teacher occasionally uses available television monitor, LCD and/or smart board to project from computer.	• Teacher uses available television monitor, LCD and/or smart board for interactive instruction.	• Teacher and students use available projection device for interactive instruction when appropriate.
DIGITAL ORGANIZATION			
• Lack of digital organization. Any organization evident is hard copy.	• Limited digital organization.	• Teacher-directed digital organization.	• Teacher encourages student-created and -maintained digital organization systems, including electronic calendars and folders.
• Paper and pencil notes • Hardcopy handouts • No obvious use of digital distribution or collection of documents.	• Teacher-directed note taking using word processing • Teacher may create multimedia presentations as student notes or for lecture • Teacher uses some simple digital worksheets • Teacher uses available electronic resources to distribute documents to students.	• Teacher-directed note taking using a variety of skills and resources, including word processing, graphic organizers, databases, spreadsheets, and presentation and outlining software • Teacher uses other forms of digital delivery, such as CD, portable hard drive, flash drive, and e-mail.	• Teachers encourage students to select from a variety of technology to organize and summarize material (e.g., word processing, databases, spreadsheets, wiki pages) • Electronic resources, such as virtualshare, e-mail, and discussion boards, are used to distribute, collect, and return a variety of digital content • Teacher provides feedback digitally through virtualshare, Web pages, blogs, wiki pages, podcasts and vodcasts.

Developed by Chris Corallo, director of staff development, and the instructional technology resource teachers in Henrico County (VA) schools.

Teachers' Integration of Technology to Support Instruction (cont.)

USE OF ELECTRONIC RESOURCES FOR INSTRUCTION			
• Print resources used exclusively.	• Teacher uses premade technology lessons, materials, and templates • Teacher supplements textbook with online content • Teacher uses Web page to post homework and communicate • Teacher uses technology and electronic resources to differentiate instruction.	• Textbooks supplement frequent use of technology resources and online content • Teacher incorporates project-based learning • Teacher evaluates electronic resources for appropriateness and effectiveness • Teacher Web page is used as an instructional tool • Teachers begin to develop their own project-based lessons.	• Teacher incorporates open-ended questioning and higher-order thinking skills in real-world, technology-rich learning experiences • Teacher facilitates student collaboration (peer editing, multimedia, literature circles, etc.) through technology such as blogs, wikis, and discussion boards • Teacher instructs students on evaluation of electronic resources and encourages use of all appropriate resources to solve authentic problems • Teachers develop their own electronic resources and lessons for students (e.g., Web quests).

Integrating Technology to Support Student-Centered Learning

Entry	Developing	Approaching	Ideal/Target
• Student use of technology is optional • Students rely on teacher for dissemination of information • Students engage in face-to-face communication • Students communicate learning through standard written and oral means.	• Students use electronic resources that have been selected by the teacher • Students use technology to solve fictitious scenarios • Teacher introduces technology-based cooperative learning strategies (e.g., group work) • Students work independently to solve problems that involve the use of technology • Students engage in electronic communication that is one-way and synchronous • Students observe teacher demonstrating the use of electronic devices to manipulate static data • Students document learning through word-processed documents, presentations, and graphic organizers • Students are provided information regarding the ethical use of technology.	• Students use Web resources that have been selected and evaluated by the teacher • Students begin to engage in technology-enhanced learning experiences that are open-ended and require higher-order thinking skills • Students engage in asynchronous and synchronous electronic communication to gain knowledge and understanding • Students use technology to solve authentic problems • Students communicate ideas through use of video, pictures, images, or graphics • Students reference and respond to spreadsheets, databases, digital video, images, blogs, wiki pages, podcasts, interactive PDF's, Web pages, video conferences, and real-time data to gather and analyze information • Students use teacher-selected electronic devices to collect, organize, analyze, and display real-time data • Students create databases and spreadsheets • Students are aware of the ethical, cultural, and societal issues relating to the use of technology.	• Students engage in technology-dependent learning that is project-based, using open-ended questions and higher-order thinking skills. • Students use electronic resources to plan, design, and execute solutions to real-world problems • Students effectively evaluate Web resources for validity • Students collaborate while using technology to solve authentic problems • Students contribute to and develop electronic products (e.g., e-mail, interactive documents, Web pages, digital video, real-time data analysis, images, video conferences, blogs, wiki pages, and podcasts) to gain knowledge and demonstrate content mastery • Students communicate ideas through a variety of media, including video, images, and graphics • Students use advanced software applications to communicate • Students select appropriate electronic devices (e.g., probes, projection beams, cameras) to gather, organize, analyze, and display real-time data • Student work demonstrates understanding of the ethical, cultural, and societal issues regarding technology.

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