How to Narrow the Digital Divide in Your School

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When schools began to purchase technology, educators feared that the economic and geographical differences among schools would create a digital divide. That is some students would have more access to computers than others. Because of this fear, districts, states, and the federal government worked hard to assure that these factors would not leave any child behind. And, by and large, the measures in place are successful. However, as we pilot test a new high school biology curriculum in 63 schools across the nation we find something surprising. The digital divide is between classrooms in a school, not between schools where we expected it to be.

Biology: Exploring Life, is a year-long biology program that is a textbook, a web site, and a hands-on lab program. This program is built upon a strong integration between the web site and the textbook that requires students to use computers regularly in the classroom or lab. This tight interdependence makes *Exploring Life* a pioneer program, unique and untested in schools. Therefore the National Science Foundation (NSF) chose to fund a team of evaluators to organize a group of pilot teachers to help guide the authors and developers as they produce the program. During the formative evaluation process, the NSF team discovered that the digital divide is the widest between classrooms in a school.

What we observe is some teachers use technology, others do not. Our observations provided us with some insight as to why this happens.

Classroom computers are so low on the budget priority list, some teachers have no choice but to teach without technology. District money is not there for classroom computers and shared labs are just too busy. Our observations show that many teachers with classroom computers have spent countless hours on their own to seek sources for funding, write grants, or solicit local businesses for equipment and money. This is a large commitment of time out of an already very busy day that not all teachers can give.

Other teachers are still waiting for the support infrastructure to catch up with the demand. Some schools do not have the internal support staff to maintain large numbers of classroom computers in addition to all the other administration computers, and shared labs.   Just like bad hair days, teachers have bad computer days. The teachers we watched became troubleshooters. If a computer goes down, they must quickly evaluate the situation. Can they fix it or should they call the technology coordinator?   It may take a week for a tech person to come. Developing troubleshooting skills takes experience over time.

Some teachers may not have enough exposure to computers to feel comfortable using them in a classroom. In the mad rush to acquire technology, training often is too little too late. One training course is not enough. Early adopters know the changes that take place and the constant need to be updated on equipment and software. This results in a competition for teachers' time with the other myriad changes in policies and curriculum that require workshops. Again, time is a huge factor against teachers using computers.

Some teachers may never use technology. Why? The reason can be as simple as some teachers prefer other methods of teaching. Technology doesn't seem to interest them. They are perfectly content to support the school's and other teachers' efforts to provide technology to students; they may even have computers in the room for the students to use. They just aren't going to use them.

However, the digital divide among teachers at the high school level does not seem to affect the comfort level of the students. Something spectacular must be happening at the elementary level to produce tech savvy students. To learn more, we interviewed principals to ask how they close the gap in their schools.

Peter Harvey from Alexander Elementary in Alexander, Maine says that it is natural for comfort level to differ between teaches. However, the age when teaching is done without technology is past. Computers are a true educational tool. Mr. Harvey suggests that the best way to encourage teachers is to make information and training available and to give teachers time to get comfortable with new technology before they take it to the classroom. His hints are:

Allow teachers time and incentive to "play" with computers. Teachers in his school are given time on the clock for computer recess. They receive an occasional half-day of release time from the students during school hours.

When you do purchase equipment, get the best you can afford. Even though donated equipment is appreciated, it is often out of date and not compatible from one computer to the other. The result is teachers get frustrated with different operating systems, speed, software, and memory. Teachers will downshift if it is complicated.

Kathi Riemer from Gastineau Elementary in Juneau, Alaska believes that the key to success is to have central management establish program standards that every school must meet. Her school district has a technology curriculum. Even the community is interested. They voted for a bond to fund more technology for students. The school also received a U.S. Department of Education Even-Start Grant that provides computer labs for adults and their children who live in project

housing. This program targets adult literacy, but it also means that children have access to technology weekdays after school hours and weekends. It is a family affair.

When our biology teachers first discussed how they might use the Exploring Life program, they first voiced that they would use the computer labs for curriculum instruction. This did not work out because the computer labs are just too busy. This happening is reflected in Ms. Riemer's hints:

Use computer labs for instruction and the classroom for curriculum projects. Grades Kindergarten through 5th have equal access to computer learning. Twice a week students have an instructional class in the computer lab that is appropriate for their grade level. For example kindergartens through 2nd graders learn basics and fifth graders learn PowerPoint.

Everything is Apple and networked so skills learned in the lab are practiced in the classroom. As in Maine, it seems that compatibility between all the computers in the school is a key factor.

Mr. Pat Berry, Vice Principal, from New Haven Elementary in Union, Kentucky reports that they take an eclectic approach to supplying technology. They have one computer lab with 30 computers and another one on the way. Teachers have at least one networked computer in their rooms; some have more. There is also a mobile lab of portable laptops that can be connected to the school's network in each room.

Finally they have Alpha Smart computers that teachers can reserve and use in his or her room. These machines are computer alternatives that function as word processors. They look like a keyboard with a small screen attached at the top. Students can create original work or teachers can download documents for the student to complete. When the students are done working, they can download their work to any P.C. or Mac computer. The advantage to these computers is that they are small, portable, and, most importantly, a small fraction of the cost of a full-sized computer. Because they are affordable, they have a ratio of one for every five students.

Mr. Berry says that professional development and workshops are key for teachers. The tech department has after school and during school in-service training time. Teachers are also given school hours for help with technology. A great benefit they offer is that they can request a substitute teacher when they attend workshops during school hours. Mr. Berry feels the majority of technology discomfort among teachers is in the past. New teachers coming into the classroom are taught the tech components needed to succeed as a teacher in a technological classroom.

Hints from this school:

Provide teachers with a substitute when they need time to work with new technologies.

Purchase a variety of types of computers and alternative computers that teachers can choose from for different types of tasks.

Our findings from the high schools who pilot tested the Exploring Life program coincides with many of the suggestions given to us by the elementary principals. All of the technology in the school needs to be compatible. Teachers need time to learn how to use technology. Purchase a variety of computers and computer alternates that can be used for different tasks; don't rely on the one computer fits all scenarios. Lastly, write grants to acquire more technology and programs.

The most important realization we find is that the principals are key for providing teachers with resources for computers as well as motivating them to learn, experiment, and use technology. The following are ways principals can use leadership skills to provide a technology rich school.

Help your teachers identify funding sources and learn how to write grants. Find experts in the community who can conduct grant writing workshops or act as advisors. Many non-profit organizations, state museum organizations, Junior Leagues, and other professional organizations have basic grant writing mini-courses that are concise and to the point. The information can easily be adapted for teachers.

Organize meetings and socials for the technology staff and the teachers. Foster communication so that teachers and technology coordinators can understand more about what each other's needs are and how they can work together. Think compatibility.

Work with teachers who are technology savvy to identify and use computer based programs that do not rely on the teacher for student access or understanding. Make sure that the students and their parents know what is available to them and how it can be accessed.

Find where students access computers outside of school and work with community leaders and parents to expand these resources. Meet with them and introduce them to the programs that students use for their schoolwork and for their own learning.

The most important finding for elementary teachers is that students are entering high school computer literate. This suggests to us that a key issue to leaving no student behind in high school is for elementary principals to encourage teachers to use technology with students. This empowers students with the needed computer knowledge for academic success regardless of their future educators comfort or experience with technology.

Visit these websites for more information about Biology: Exploring Life
http://www.usingexploringlife.com,

Alpha Smart Computers http://www.AlphaSmart.com, and U.S. Dept. of Education Even Start
Grants http://www.ed.gov/offices/OESE/SASA/evenstprogresp.html