

## HEAD OF THE CLASS

How Teachers Learn Technology Best

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How can it be," Stanford professor Larry Cuban once asked, "that so much school reform has taken place over the last century, yet schooling appears pretty much the same as it's always been?"

A similar question might well be asked about the integration of new technologies into education: How can it be that so much has been invested in equipping and wiring schools, yet few teachers are using the new technologies on a frequent and sustained basis to enhance student learning?

The answer, as some schools are discovering, is that the kinds of training programs offered in the past might not represent the most generative method of reaching a full range of teachers and their students. The key word here is "generative" -- meaning that behaviors and daily practice will be changed for the better as a consequence of the professional development experience.

According to Market Data Retrieval, the majority of American teachers receive fewer than five hours of technology-related professional development annually, and most of that seems to be simple training. Instead, teachers should be learning to use new tools to help students master the key concepts and skills embedded in the curriculum standards.

Education technology is not about PowerPointing, spreadsheets, or word processing. The focus of professional development should be on teaching and learning strategies that make a difference in daily practice -- on activities that translate into stronger student performance. As a result of these practices and the use of these new tools, students should be able to read, reason, and write more

powerfully; communicate productively with members of a global community; conduct thoughtful research into the important questions, choices, and issues of their times; make sense of a confusing world and a swelling tide of information; and perform well on the new, more demanding state tests requiring inferential reasoning.

That is a tall order, but fortunately, some schools are identifying promising new approaches. These districts are finding that adult learning, curriculum development projects, and informal support structures promote recurrent use of technologies aimed at deep curriculum integration.

### **What teachers need**

The thoughtless embrace of new technologies can result in slick student performances that are both glib and thin -- what some call "PowerPointlessness." Networks often bring with them a flood of information that is shaped, in part, by pop culture and tabloid values. At its worst, information from the Internet can be Disneyfied or distorted. Without a focus on sound educational principles, learning with these new technologies can induce a kind of cut-and-paste thinking that might actually undermine students' ability to think.

It makes sense, then, to start with curriculum and student learning as the clear purpose for the school's computer network. Schools create standards-based activities that employ whatever technologies make sense -- books, e-mail, web sites, whatever. Learning is the goal; technologies are mere delivery systems. The true challenge of professional development is to inspire and prepare teachers to launch these activities with the tools that make sense.

The evidence mounts, however, that few American teachers feel adequately prepared for the challenge of using new technologies in any fashion -- not to mention the challenge of using technologies to support curriculum-rich, standards-based lessons. Too little time is devoted in the wrong way to the wrong goal.

Research by Henry Jay Becker of the University of California, Irvine, shows that teachers' preferred teaching strategies and styles usually shape the way they use technology. "Traditional" teachers, he says, are far less apt to allow students to use new technologies than are "constructivist" teachers, even when they have five or more networked computers in their classrooms. Becker's research points to the need to do much more than teach technology skills to teachers. We must also convince them of the value of engaging students in problem-based or project-based learning with these new tools.

Providing 100 additional hours of learning computer software is not likely to transform traditional teachers into constructivist teachers. The transformation of teaching styles, preferences, and behaviors requires persuasion, learning by experience, and highly personalized learning journeys.

### **Where we've gone wrong**

Schools have relied too long on training models and have put too much emphasis on learning software. The training model usually involves a march through a series of skill lessons with little adjustment made for students' individual learning styles, developmental stages, or personal preferences. Because the skills are often learned out of context, they seem remote from classroom practice and leave many teachers wondering about the utility and worth of such skills.

What makes this training model even worse is the frequent use of generic examples that widen the gap even further for the teacher who is asking, "How can I use this tool to teach fifth-grade social studies?" And worse yet, many software training companies rely on business examples and know little or nothing about education. When "office" training becomes the norm, many teachers rebel at the intrusion of office metaphors, examples, and content into programs that should focus on schools, classrooms, curriculum, and students.

The training model sometimes adds insult to injury by rushing the learner through dozens of skills in too short a time, with insufficient guided practice to reach a comfortable level of familiarity and skill. Rushing learners will only aggravate any anxiety, concern, and latent resistance they already feel.

Clearly, the training model isn't working. After 20 years of training teachers to use new technologies, a large percentage of them report feeling ill prepared to use technologies in curriculum-rich ways. Data reported in Education Week's Technology Counts '99 show that teachers are not making widespread use of their networks, now that many more schools and classrooms are wired. In fact, according to Technology Counts, most teachers say they are not well prepared to use new technologies.

## **Cultivating professional development**

The most effective learning strategies require a change in the ways teachers spend their time and the ways they work together. Informal support systems, partnerships, teams, and collaborative structures might be the most effective elements in a broad-based change effort.

Gardening provides a useful metaphor: We will see more growth if we cultivate the soil and fertilize before planting. Focusing exclusively on skills and software is a bit like spreading seeds across a concrete playground.

As in gardening, too, cross-fertilization can produce more fruitful results than can individual efforts. In many schools, teachers are isolated from each other and preoccupied with getting through their schedules. Many teachers will cling to routines they have enjoyed in the past until they are equipped and encouraged to find, invent, and test new routines that are suitable and reliable replacements. This creative exploration requires a change in schools that breaks down isolation, facilitates the work of teams, and provides ample time for program development.

The work of Michael Fullan, Bruce Joyce, Terence Deal, and Ann Lieberman makes it quite clear that real change requires attention to many organizational issues rarely addressed by those installing networks and computers.

### **Effective strategies**

Real change in a school's learning culture also demands a comprehensive effort. Taken separately, various individual efforts might make important contributions, but the best approach is to blend many strategies together so that they create a compounding impact on the learning culture. Here are some to consider:

- **Professional growth programs.** Under this scenario, the district -- with the support of the teacher association -- adopts a professional growth program that clarifies the commitment of the board and the staff to the value of on-going professional development and change.

A key component is the professional growth plan (PGP) written by each teacher, following district guidelines. This document, which is shared with the building principal, becomes the road map to guide each teacher's learning during the year and helps the principal be an effective supervisor, providing resources and support as needed.

Typically, the teacher lists two or three main areas for growth and specifies activities most likely to promote the growth. If the district has made a major investment in new technologies, all teachers might be asked to include a technology integration goal.

- **Study groups.** Teachers gather in small groups of their own choosing to meet weekly for an hour or more to pursue shared growth goals, as listed in their PGPs. They determine the best path toward completing the goals. They might sign up for classes, call for small tutorials, browse online resources, read outstanding professional books, and attend conferences together. In keeping with the tenets of adult learning, teachers learn best when they can make choices in content, pacing, and styles while enjoying the support of a team of like-minded fellow learners.

- **Curriculum development/invention teams.** When teams of teachers gather to build standards-based units that they can actually use with their students, some remarkable technology learning takes place. Mixing skeptical, late-adopting teachers on the same team with enthusiastic early-adopters and a strong school librarian can lead to convergence and mutual respect, as all the inventors find common ground during the invention process.

Even though the focus of these activities might be student learning and curriculum, participants are "learning by doing" -- another basic tenet of adult learning. Those with limited technology skills often emerge with more comfort, skill, and competence -- and the appetite and inclination to use the new tools.

Many school districts -- including Baltimore County, Md.; Grand Prairie, Texas; and the Country Areas Program in New South Wales, Australia -- have employed this strategy to create dozens of [research modules](#). Another successful example of this approach comes from California, where, under a three-year Challenge Grant program, the San Diego Schools immersed teachers in substantial learning that resulted in the creation of many outstanding Internet-based lessons, called [WebQuests](#).

- **Technology coaches, mentors, and cadres.** Just as novice rock climbers and pilots benefit from the tutelage and support of more experienced climbers and fliers, schools find that teachers can make good progress with the kinds of learning associated with new technologies if they have skilled partners working alongside them.

Some districts assign effective teachers to this role full time for a year or more, so that late-adopting teachers have a built-in support system to take them through the difficult early stages. The mentor's involvement is temporary and drops away as the novice teacher develops skill and confidence.

In a related strategy, schools create leadership cadres with a broad mix of teachers who explore the leading edge of new practices and sort through publishers' often inflated claims to help the rest of the teachers focus their learning on opportunities that are worth pursuing. In this way, the cadre becomes a prime factor in planning [professional development opportunities](#) for the rest of the staff.

In Omaha, Neb., Educational Service Unit No. 3 made peer coaching and the teacher cadre key ingredients of its highly successful grant-supported project, [The Learning Web](#). Invention teams from surrounding school districts gather each summer to invent curriculum units with strong technology elements. Each team works with a specially trained facilitator to guide the process.

- **Just-in-time support.** In this approach, schools strengthen the resources available on a day-to-day basis so that any teacher who is having difficulties can find help within minutes. Instead of relying on a few specialists who never seem to be available, the school makes sure that one-third of the staff has specialized technology skills and can be called on to support colleagues who are looking for guidance, encouragement, and timely troubleshooting assistance. Supplementing this adult support is gender-balanced support from students who are taught how to support others diplomatically in their technology efforts.

In the [Antelope Valley \(Calif.\) Union High School District](#), this just-in-time support is delivered via laptop carts at each high school by providing extra staffing that is rarely available in most schools: (1) a full-time instructional technology teacher with technology coaching responsibilities; (2) a one-period laptop coordinator; (3) a technology aide responsible for keeping all the laptop carts and equipment operating at full capacity; and (4) one or more computer lab assistants and full-time network support technicians. This additional staffing makes just-in-time support a reality, allowing teachers to focus on teaching.

- **Help lines and FAQs.** Just as many companies are finding that customers can get timely assistance through online help resources and FAQs, schools could and should provide more of this kind of support so that teachers can swiftly find answers to commonly asked questions and frequently encountered problems. A friendly person on a help line can ease teachers' sense of isolation and frustration and boost their willingness to take risks with technology.

- **School visits, conferences, and other excursions.** Real change can occur when teachers have a chance to see more of the outside world. Typically isolated from new developments in the workplace

or in other schools, teachers have little basis for shifting their own behaviors, little opportunity to appreciate the upheaval in practices around them. A day spent behind the scenes in an architectural office, a shipping company, or a newspaper can show how technology works in other settings and motivate teachers to explore new approaches. Such excursions can have tremendous value, provided they are followed by well-structured consideration of implications for the learning program back at school.

- **Online learning.** Many teachers are beginning to taste a mixture of online learning experiences that allow for progress without attending formal classes. Some of these new offerings are little more than 1950s college syllabi dressed up with online reading assignments and chat sessions. Others offer learning that is enticing, substantial, and generative.

Districts can now contract for online professional development programs with providers such as [Apex Learning](#), Classroom Connect's [Connected University](#), and [Teacher Universe](#).

If designed properly, these online learning programs may offer many advantages: an emphasis on learning as opposed to teaching; learning that is independent of time or place; and learning that is self-paced, customized, and competency-based.

## **The bottom line**

When a district puts the horse before the cart, investing all of its money in equipment and networking rather than taking a more balanced approach, there will be little left over for human infrastructure once it has finished with the installation of a network.

But it need not be so. By slowing down and taking advantage of concepts such as "strategic deployment" -- moving wireless computers around to maximize usage -- a district can achieve more actual contact time with fewer desktops. Unfortunately, most districts spread equipment out thinly and evenly, so that no teachers have "critical mass" of available equipment. In many of these classrooms, the equipment will see little use.

Before committing most funds to equipment, school boards should give attention to planning concepts such as the total cost of ownership -- that is, all of the costs associated with operating a network of computers. While it may be tempting to focus on the hardware, that is a dangerous and short-sighted approach.

Boards should also ensure that a thoughtful assessment strategy is in place to determine teachers' level of development and identify offerings that match their needs and preferences. Such an assessment strategy makes it possible to steer the program forward. (See "[Finding Your Way Through The Data Smog](#)" by Joe Slowinski.)

The ultimate goal is daily, effective use of new technologies in standards-based, curriculum-rich lessons. We should be able to walk down the hallways of any school in the district and see teachers and students using tools -- sometimes a book, sometimes a calculator, sometimes a networked computer -- in appropriate, powerful ways.

If we invest in robust professional development with an emphasis on adult learning strategies, we can expect all teachers to learn, grow, and move forward, sometimes relying on high touch, sometimes on high tech, and sometimes on a magical blend of both.

Jamie McKenzie is the editor of [From Now On](#), an online education technology journal. His most recent book is *Beyond Technology: Questioning, Research and the Information Literate School*, published by FNO Press. This article copyright 2000 by Jamie McKenzie.

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