# Pre-Session Assignment #3

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Jamie McKenzie's paper, *How Teachers Learn Technology Best*, looks at the elements of an effective IT training program. It elaborates on how some schools are now finding the program it offers is not of the "generative" method of reaching a full range of teachers and their students. McKenzie explains that "generative" is the key term as this is the behaviour and practice that changes for the better as a result of the professional development experience.

There are three elements that lead districts find are helpful in promoting the recurrent use of IT in the curriculum. These are adult learning, curriculum development projects, and informal support structures. Adult learning strategy are different from training strategies in that "they are tailored to learning styles, preferences, and needs of teachers in ways that will win their commitment." With this, teachers take control of their learning by planning, acting, and growing. Professional development as an organizational development was found to be most effective in fostering growth in IT. The use of informal support systems, partnerships, and teams allows teachers to invent effective lessons. When teachers move away from their fixed routine to invent and test alternative ways to deliver their lessons, it breaks down the isolation and creates a collaborative climate. Informal support groups also allows for "just in time support." When a teacher is having difficulty, he/she is able to find trouble shooting assistance within a few minutes. This is important an important aspect in the continued development of IT skills.

It is not uncommon to find the IT teacher taking on the responsibilities of teaching, maintaining, updating, and supporting the staff in the area IT. This type of set-up is not only impossible, but is a major cause to stress leaves. There is a prevailing

attitude that the IT teacher can drop what he/she is doing and correct the problem at hand. IT teachers choose to be in this role because they find the work challenging and are motivated in regularly updating their skills. This is quite different from other curricular subjects as it is rare to find it changing at the pace of IT. In IT, programming languages, software, and hardware commonly change. This paper shows that with a clear design model, IT can be learned and transferred to the students to allow them to "use new tools to master key concepts and skills embedded across the curriculum." The challenge though is to introduce IT in such a way that promotes usage that is curriculum rich and likely to make a discernable difference in the student achievement. The author points out the weakness of training programs. These training programs are the ones that rush the learner through dozens of skills and use a generic model to illustrate the concept without regard to the needs of the learner. The author proposes changes that are practical and can be implemented with little cost. However, the risk of change poses the most challenge to IT leader. As IT leaders in the educational system, it is important that we lead by example and design a plan that allows input from all stakeholders. This not only makes sense, but is also regarded as best practice.

McKenzie, J. (2001). *How Teachers Learn Technology Best.* Educational Technology Journal, 10(6), 1-14. Retrieved April 17, 2003 from http://fno.org/maro01/howlearn.html

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# How Teachers Learn Technology Best

By Jamie McKenzie

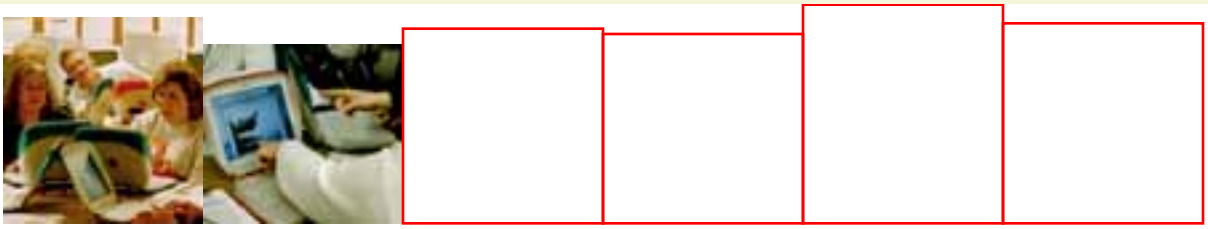
(Note: This article first appeared in the January, 2001 issue of **Electronic School**, a publication of the National School Boards Association and is  It also appears as a chapter in **Planning Good Change**.)

When it comes to teachers learning and valuing the effective use of new technologies, some schools are discovering that the kinds of training programs offered in the past may not represent the most generative method of reaching a full range of teachers and their students. The key term is "generative" - meaning that behaviors and daily practice will be changed for the better as a consequence of the professional development experience.

Fortunately, some schools are now identifying approaches more likely to encourage teachers to employ these technologies on a frequent and sustained basis to enhance student learning.

Lead districts are finding that adult learning, curriculum development projects and informal support structures are proving powerful in promoting recurrent use aimed at deep curriculum integration.

After two decades of providing software classes to teachers, we need to explore different approaches — those honoring key principles of adult learning while placing both curriculum and literacy ahead of software and technology.



As will be explained later, adult learning strategies are fundamentally different from training strategies and usually more promising because they are tailored to the learning styles, preferences and needs of teachers in ways more likely to win their commitment than the approach more typical of training models.

In some places, eager planners have "put the cart before the horse" - emphasizing the purchase and installation of equipment without providing sufficient funding for the staff learning required to win a reasonable return on the huge investments being made.

We have evidence from Market Data Retrieval (MDR) (1999) that the majority of American teachers enjoy fewer than five hours of technology related professional development annually, and most of that seems to be training.

In many schools, the failure to fund and design robust professional development leads to "the screensavers' disease" — the educational equivalent of an accountant's red ink — as hundreds of computers sit idly glowing throughout the day and the district's investment proves a huge waste of funds.

This challenge should be about using new tools to help students master the key concepts and skills embedded in the science, social studies, art and other curriculum standards. It is not so much about powerpointing, spreadsheeting or word processing. The focus should be on teaching and learning strategies that make a difference in daily practice — on activities translating 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
- perform well on the new, more demanding state tests requiring inferential reasoning

This article will outline how teachers learn technology best and how districts may promote such learning to avoid "the screensavers' disease."

**Defining the Challenges**

While it is tempting to make frequent usage the goal of this technology

professional development, schools should focus efforts on promoting usage that is curriculum rich and likely to make a discernible difference in student achievement.

There is some risk that new technologies may unintentionally lead to slick student performances that are both glib and thin. Some call this superficial and glitzy use of technologies "powerpointlessness."

When networks enter schools, they often bring with them a flood of information that is shaped, in part, by pop culture and some of the tabloid values typical of some modern media. At its worst, information from the Internet can be either 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 the ability of students to think.

It makes sense to start with curriculum and student learning as the clear purpose for the network. Schools create standards-based activities that employ whatever technologies make sense . . . books, e3-mail, Web sites, whatever. Learning is the goal. Technologies are mere delivery systems.

The true challenge of professional development is to inspire and prepare classroom teachers to launch these curriculum rich activities with the tools that make sense.

**Evidence of Shortfalls**

The evidence mounts that few American teachers feel adequately prepared for the challenge of using new technologies in any fashion, not to mention the challenge of using techologies to support curriculum rich, standards-based lessons.

MDR reported in 1999 that 60% of a national survey of teachers claimed five (5) hours or less of training annually, and yet this article argues that training is not the right approach to inspire teachers to make meaningful use of networks. We see too little time devoted in the wrong way to the wrong goal. We need more time and resources applied in the right way to the right tasks.

Hank Becker’s research shows that the preferred teaching strategies and styles of teachers usually determine or shape their patterns of technology usage. Those he calls "traditional" teachers are far less apt to allow students to use new technologies than "constructivist" teachers even when they have 5 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. One hundred 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 the provision of highly personalized learning journeys.

**Weakness of Past Efforts and the Training Model**

Schools have relied too long on training models and have put too much emphasis on the learning of software. The training model usually involves a march through a series of skill lessons with little adjustment made for 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 their utility and worth.

What makes this training model even worse in some cases is the use of generic examples for practice that widen the gap even further for the teacher who is asking "How can I use this tool to teach fifth grade social studies?"

Generic examples and practice are further compounded when a district contracts with one of many software training companies that rely upon business examples and know little or nothing about education.

When "Office" training becomes the norm, we should not be surprised that many teachers rebel at the intrusion of office metaphors, examples and content into programs that should, instead, focus on schools, classrooms, curriculum and students. Districts should, instead, provide "School" learning experiences and opportunities.

The training model sometimes adds insult to injury by rushing the learner through dozens of skills in too short a time period with insufficient guided practice to reach a comfortable level of familiarity and skill. If the trainer rushes the learners, there is great danger that the anxiety, concern and latent resistance of many of the more reluctant learners will be aggravated.

Even after twenty years of bringing these new technologies into schools and offering training, we are finding that a large percentage of teachers reports feeling ill prepared to use them in curriculum rich ways.

Data reported in **Education Week's Technology Counts'99** shows that teachers are not making widespread use of their networks now that many more schools and classrooms are wired. They also found that most teachers reported that they were not well prepared to use new technologies. http://www.edweek.org/sreports/tc99/tables/us-t1.htm

There is considerable risk that districts will now rush to fill the professional development void with hundreds of hours of teacher training — hours that are unlikely to covert reluctant, late adopting, skeptical teachers into true believers and frequent users.

## Main Principles of Adult Learning

What do we mean by "adult learning" and how does it differ from the training models that have dominated technology related professional development for the past two decades?

The clearest way to contrast **adult learning** (often called "**andragogy**") with **pedagogy** (instructor directed learning) is to note that adult learning usually involves the learner in activities that match that person's interests, needs, style and developmental readiness.

Fundamental beliefs:

1) **The learner may make choices** from a rich and varied menu of learning experiences and possibilities.

2) **Learners must take responsibility for planning. acting and growing**.

If we shift school cultures to support adult learning, professional development is experienced as **a personal journey of growth and discovery** that engages the learner on a daily and perhaps hourly basis. In the best cases, andragogy includes an emphasis upon self-direction, transformation and experience. One learns by doing and exploring . . . by trying, by failing, by changing and adapting strategies and by overcoming obstacles after many trials.

Unlike the training models, adult learning is primarily concerned with creating the conditions, as well as the inclination and the competencies to transfer new tools and skills into daily practice. While training usually occurs outside of context and frequently ignores issues of transfer, adult learning is all about melding practice with context. Adult learning should encourage teachers to identify and then remove obstacles.

What matters is what happens back in the classroom on Monday morning.

## Professional Development as Organizational Development

The most effective learning strategies require a change in the ways teachers spend their time and the ways they work together. Frequently we notice how informal support systems, partnerships, teams and collaborative structures may be the most efficacious elements in a broad-based change effort.

Gardening provides a useful metaphor for this process. We will see more growth if we cultivate the soil and fertilize before planting. An exclusive focus on skills and software is a bit like spreading seeds across a concrete playground.

While some maintain that reluctance to use new technologies is simply rooted in a lack of skill and confidence, there is evidence from Becker and Fullan that teachers need to be recruited. They must be convinced of the value of the new activities and then given ample time to work on teams to invent effective lessons.

In many schools, teachers are isolated from each other and preoccupied with what Fullan calls "the daily press" of getting through their schedule, focused according to Becker on state standards. Quite a few of these teachers are likely to 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, invention and testing will require 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.

> **How can it be that so much school reform has taken place over the last century yet schooling appears pretty much the same as it's always been?**
>
> Larry Cuban

**Effective Strategies and Projects**

- **Professional Development Plans** (PGPs)

  The district adopts a professional growth program with the support of the teacher association that clarifies the commitment of the Board and the staff to the value of ongoing professional development and change.

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

  Typically, the teacher lists 2-3 main areas for growth along with the activities most likely to promote the growth. One goal might be to acquire the technology and instructional skills to launch classroom research

projects using a model such as WebQuests or Research Modules (http://fno.org/url.html).

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 on a weekly basis for an hour or more to pursue shared growth goals as listed in their PGPs. They determine the best path toward completion of the goals. They may 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. Carlene Murphy (1998) and others have developed and tested study group models that fruitfully engage every teacher in such activities.

- **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 late adopting, skeptical teachers on the same team with early adopting, enthusiastic teachers and a strong school librarian leads to convergence and mutual respect as all the inventors find common ground during the invention process. http://staffdevelop.org/invent.html

  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 far more comfort, skill and competence. More importantly, they develop the appetite and inclination to use these new tools so often lacking.

  Baltimore County, Maryland , Grand Prairie, Texas, and the Country Areas Program in New South Wales (Australia) have employed this invention team strategy to create dozens of research modules. (http://fno.org/url.html)

  The San Diego Schools involved many of its teachers in a Challenge Grant program that took three years, immersed teachers in substantial learning and resulted in the creation of many outstanding WebQuests. The full story is well documented at http://projects.edtech.sandi.net/

  Participating schools had to commit matching funds and 20 per cent of the teachers. In the first summer they built a foundation of technology and curriculum planning skills. In subsequent summers, learning

strategies such as the use of graphic organizers and scaffolding became the focus as they turned to the actual building of units. Examples can be found at

http://projects.edtech.sandi.net/projects/

- **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 during the lesson development and implementation stages.

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

  In a related strategy, schools create leadership cadres with a broad mix of teacher types who take the time and trouble to explore the leading edge of new practices and sort through the often inflated claims to help the rest of the teachers focus their learning on opportunities worth pursuing. The creation of such internal leadership requires a substantial investment by the district, but the return on investment is high as the district can protect itself from bandwagons and unhealthy reliance upon outside consultants and vendors.

  The cadre becomes a prime aspect of planning the professional development opportunities to be offered to the rest of the staff.
  http://staffdevelop.org/cadre.html

  In Omaha, Nebraska, the Educational Service Unit #3 made peer coaching and the cadre a key ingredient 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.
  http://www.esu3.org/special/institute/index.html

- **Informal Support Groups and Support Staffing — "Just in Time Support"**

  Following up on the gardening metaphor mentioned earlier, each school tries to deepen the resources available on a day to day basis so that any teacher who is frustrated, blocked or having difficulties is likely to find help within just a few minutes. Instead of relying upon a few specialists who will never seem available, the school makes sure than one third of

the staff is quite good at something and can be called upon to support colleagues who are looking for guidance, encouragement and timely trouble-shooting assistance. Supplementing this adult support would be gender balanced support from students — what one media specialist calls her "tech tutors" — students who are taught how to support others diplomatically in their technology efforts.

In the Antelope Valley Union High School District, California, where laptop carts are an important strategy, this "just in time support" is also delivered at each of several high schools by providing extra staffing rarely available in most schools.

The AVUHSD provides the following at each of its six high schools: 1) a full time instructional technology teacher with technology coaching responsibilities (might be shared between two people in some schools), 2) a one period laptop coordinator, 3) a technology aide responsible for keeping all the laptop carts and equipment operating at full capacity, 4) one or more computer lab assistants and one or more full time network support technicians. This staffing makes just in time support a reality so teachers can focus on teaching. http://www.avdist.org

- **Help Lines & FAQs**

  Just as many companies are finding that customers can get timely assistance through online help resources & FAQs, schools could and should provide many more of these kinds of support systems so that teachers can swiftly find answers to commonly asked questions and frequently encountered problems. The willingness to take technology risks may be encouraged by the availability of a friendly person on a help line to erase the sense of isolation and frustration.

- **Excursions: School Visits, Work Place Visits, Conferences, etc.**

  Significant shifts in behavior and understanding 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 transform perspectives and prove very motivating. The whole notion of "excusions" has tremendous value provided the visits are followed by well structured consideration of ramifications 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 as we have known them. 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** (http://www.apexlearning.com/td/), **Classroom Connect's Connected University** (http://cu.classroom.com/), and **Teacher Universe** (http://teacheruniverse.com/).

If designed properly, these online learning programs may offer many of the following advantages:

- An emphasis on learning as opposed to teaching
- Learning independent of time or place
- Self-paced
- Customized
- Competency-based
- No heroes needed
- Uniform
- Cost effective

For a full explanation, see "Web-Based Learning: A Strategy to Avoid Heroics." http://staffdevelop.org/online.html

**Orchestration**

The best approach is to blend many of the strategies above together so that they create a compounding impact on the learning culture. They may each make an important contribution separately, but broad-based change and the widespread use of new technologies will usually demand a more comprehensive effort. The strings, the woodwinds and the percussion section cannot carry the symphony by themselves.

An effective program requires the skillful orchestration of all of these program elements to achieve the kind of synergy that leads to major transformations

and shifts in practice.

**Resource Issues**

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, the strategies outlined in this article may seem preposterous. These districts rarely have any money left over for human infrastructure once they have finished with the installation of a network.

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

For alternatives strategies, see "Picking up the Tab for Robust Professional Development" at http://staffdevelop.org/funding

Before committing most funds to equipment, boards should give attention to planning concepts as "the total cost of ownership." (Van Dam, 1999) While it may be tempting to focus on the hardware, it is a dangerous and short sighted approach.

**Measuring Return on Investment**

There is far too little assessment being done to guide professional development. Most districts do not know the level of development already achieved by staff, let alone their preferences, styles, fears and passions. A thoughtful assessment strategy helps to identify offerings that stand a chance of matching preferences, and then assessment makes it possible to steer the program forward. See "Finding Your Way Through The Data Smog" by Joe Slowinski at http://fno.org/sept00/data.html

**The Bottom Line**

We expect to see 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 note teachers and students using tools in appropriate, powerful ways . . . sometimes a book, sometimes a calculator, sometimes a networked computer.

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

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