Technology Diffusion

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INTRODUCTION

American education is facing a growing crisis. Confidence in public education is decreasing, as many schools appear unable to deliver quality education to all students. Wanting to return budget surpluses, many legislators insist that educators do more with less, despite the fact that classes are often too large, curriculum is often old, schools are often in need of repair, and fuel and other expenses are rising. And we face a nationwide teacher shortage that will get worse before it gets better. These forces, together with conflicting political agendas and changing educational philosophies, buffet educational processes which angers teachers, confuses students, and annoys parents.

A wide variety of techniques have been proposed to correct real and perceived problems. One solution has been to bring technology into the classroom, hopeful that it would spark an educational productivity revolution. Few people questioned the assumption that if information technology can revolutionize workplace productivity, then its application to education should improve classroom productivity. Many, therefore, take it on faith that all we have to do is put computers into the classroom and connect them to the Internet, and a world of interactive learning will be opened to curious minds. "Diffuse it and they will use it" has become the educational equivalent of the *Field of Dreams* approach of "build it and they will come." The money has been spent, but the hoped for productivity revolution has not occurred, and many people—educators as well as non-educators—want action as well as answers.

In school, kids do not get the time they want or the help they need, while teachers often view the time kids spend on computers with skepticism. Worse, there is a growing sense of irony among teachers that unrealistic expectations, brought about by expenditures for technology, may have precipitated some of the pressure teachers now face. These include the use of scripted instructional materials and standardized tests. Some educators feel that these have resulted in the commodization, or "dumbing down" of the educational experience that is at the heart of the decline of the teaching profession. If true, misguided and unsuccessful attempts to utilize technology at the elementary grade level may actually be contributing to the growing national problem.

Further, many classroom teachers believe that a "one-solution-fits-all" technology-based approach may be as much of a problem as a solution. By focusing on equal access, the opportunity to use technology to deal with specific student needs has been obscured. In effect, as teachers struggle to provide kids with the educational equivalent of a balanced diet, they have no time and little technology to deal with problems that interfere with learning.

In addition, in-school and after-school programs are not viewed from a "systems" perspective. There is no program or plan to develop complementary programs whereby the increasingly formal curriculum of the in-school program is complemented by informal after-school programs. Yet, because public schools meet for only six hours per day, 180 days per year, children spend only 20% of their waking hours in school. This leaves 185 days per year and many hours each day free as a time for both risk and opportunity. An after-school program is needed to provide kids with entertaining and educational after-school materials and activities. The program should also provide after-school caregivers with the tools, techniques, and information needed to help kids learn, as well as to stay out of trouble.

In short, we must rethink how, when, and where to introduce technology into the educational process. This article attempts to look at the crisis from an elementary school perspective, to examine problems with in-school programs, and discover how an alternative after-school program could help.

CONCEPT

This article suggests a complementary three-part approach consisting of a new in-school model and a unique after-school program to more effectively utilize technology as a resource for teachers and parents. In addition, this article argues that if the teacher-as-doctor model is more appropriate than the teacher-as-nutritionist model, then a research and development program is needed to develop the tools and techniques needed to fully deal with a growing number of educational maladies.

In School

Historically, the principal use of educational technology in the classroom has been to create and/or deliver content. Mimeograph machines, copying machines, television and VCRs, and now computers and the Internet are all content conduits. The teacher controls content access. This is the "teacher-as-nutritionist" model. It assumes that kids are equally capable of absorbing content, internalizing it, and transforming it into an education. The job of the teacher is therefore to give each kid an equal daily ration of "content."

In addition, many people believe technology can help students bypass the teacher. Corporate productivity improvements rely on pushing the responsibility to the lowest level, but elementary schools are not "corporate America." Content without context is not education. A complementary, if not alternative model is proposed in which ignorance is viewed as a treatable disease. Public education is no less important than public health. In this model, teachers would concentrate on developing a wide variety of tools and techniques to assess and treat educational disorders. The goal is to use intelligent combinations of talent, techniques, and technology to identify and treat specific problems. The prescription: pinpoint specific problems that interfere with the learning process, identify technology that will solve the problems, and apply the technology only where it is needed.

Doctors do not give all patients antibiotics because it is "fair." Trying to get an equal but arbitrary amount of computer time for each kid may be fair, but it is a waste of time and money. HMOs do not prescribe treatment. Legislators, like HMOs, may put limits on treatment options, but they refrain from dictating prescriptive treatments such as scripted curriculum and excessive testing. Teachers know what is best for students; given the proper resources, teachers will do what is best for students.

As an example, fourth-grade boys often have well-developed verbal skills. However, their poor handwriting skills get in the way of expressing themselves in writing. Thus, a temporary lack of motor skills can cause writing skills to atrophy. Technology can help. If voice recognition software were available, kids could use computers to transcribe their stories. The computer could help correct spelling and grammar as part of the process. Of course, handwriting is important, and the use of voice recognition software should be used in conjunction with other efforts to improve their handwriting.

Another example surrounds language. For an increasing number of kids, English is a second language. Listen in on any large, inner-city school and you will hear dozens of languages spoken. While voice recognition and language translation technology may be useful in the classroom, it may prove even more useful in dealing with parents who do not speak English at all. For example, when teachers cannot communicate with parents, the parents miss conferences and kids miss homework assignments. In other words, technology should be developed to keep parent language barriers from getting in the way of their children's education.

After-School

Complement in-school content delivery programs with a nationwide "summer camp" program that utilizes a counter-intuitive approach to education. The approach: use technology to get kids to spend less time, not more time, in front of the computer. Concentrate on 8-12 year olds, not high school students. Forget about hyperlinks and standard browsers; create a new way to structure and access content. Embrace public-private partnerships. Roll it out nationally. Last but not least, forget formal curriculum and standardized testing. Once fully deployed, the program could be made available to public and private schools as a sort of in-school, year-round summer camp for libraries and classrooms.