RUNNING HEAD: Students Can Be Educated Without Computers

Students Can Be Educated Without Computers

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Abstract

The public education system does not need to incorporate technology in order to advance learning, because the way children learn remains unchanged; based on sound pedagogical ideas inherited from previous centuries. Computers in the classroom are pushing aside tried-and-true traditional teaching methods, while at the same time shrinking available funds for textbooks, and increasing teacher workloads. Spending time with computers fosters a lack of human interaction, a loss of communication skills, and stifles children's creativity. Computers are detrimental to student health causing such difficulties as repetitive stress injuries, computer vision syndrome, posture issues, and obesity. Despite billions of dollars spent on technology over the past ten years, student achievement indicators are flat. We must forego technology and return to basics.

Students Can Be Educated Without Computers

Technology has taken our country by storm, running in this maddening race for faster, bigger and easier access of information for our future generations by being subjected to social isolation, stifled creativity and increased health risk. Computers in the classroom are pushing aside tried and true traditional teaching methods, shrinking available funds for textbooks and increasing the workload for teachers. As the 50s and 60s developed “baby boomers”, we are now cultivating “baby laptops”. It is imperative that we, as an educational society, stop and get realistic about why, “They spent seven million dollars so their students can watch television in school. I’m wondering how many teachers they could hire and how many books they could buy for seven million dollars. What’s wrong with this picture?” states Clifford Stoll from North Carolina (Stoll, 1995). Schools are spending millions of dollars on technology as a mainstay when teacher instruction, textbooks and activities have been successfully educating our students.

Computer Time Fosters Lack of Human Interaction and Communication Skills

Human biology and psychology tells us that children’s social, emotional, intellectual, physical, and spiritual needs are at odds with the rush to computerize education. There is a sequence to human development and it takes time. Today’s children are not being given time to be children.

Child development expert, Dr. Stanley I. Greenspan, former Director of the Clinical Infant Development Program at the National Institute of Mental Health, warns that an, “emphasis on computers in childhood exacerbates the tendency for our increasingly rushed and impersonal culture to harm the emotional development of children (Alliance for Childhood, 1999).

Kids are living much more isolated lives than ever before. Human emotions guide our learning and behavior. Children need more interpersonal time with caring adults. The best gift a

parent can give a child is time doing things together. By 1997, because of more computer use at home and school, kids were spending 40 percent less time with caring adults than in previous times (Alliance, 2004). In 1999, a study was done by the Kaiser Family Foundation that found children ages 2 to 18, spent on average about 4 hours and 45 minutes a day outside of school plugged into electronic media of all kinds (Alliance, 2004). Another study estimated that children between the ages of 10 and 17 will experience nearly one-third fewer face-to-face encounters with other people throughout their lifetime as a result of their increasingly electronic culture, at home and school (Alliance, 200).

Development experts say the intense challenges of face-to-face interactions offer children the most emotionally maturing experiences (Davis & Shade, 1994). Teachers and parents need to ensure that students are given ample human interaction experiences because when these experiences are replaced with computer-based lessons you end up directing attention toward what goes on with the tool that students are using rather than what is going on in their minds. In fact, some researchers suggest that, "young students seem to be mesmerized by, and some even addicted to, the action on their screens, rather than motivated to learn. A fascination with technology, they caution, is not the same thing as a motivation to learn about educational subjects beyond the technology itself. Even some software producers admit that the most mesmerizing educational software may be more entertaining than educational" (Alliance, 2004).

Computers Stifle Children's Creativity

Too much technology can stifle children's creativity. As children grow up, they develop their creativity by using imagination, participating in dramatic play and solving problems through hands-on interaction. Much of this development takes place in a child's learning

environment, the school. Schools continue to replace these developmental activities with computer-generated learning. Therefore, the natural progression of a child's creative development is delayed. Jane Healy, an educational psychologist says, "…growing awareness of brain development emphasizes the importance of a physically active, linguistically-rich, creative and three-dimensional learning environment." (2004).

Students are constantly being exposed to computer generated art throughout their learning. Children do not have a chance to develop their imagination because computer games already have images that children would have normally created in their own minds (Are These Essential Activities Being Replaced by Technology, 2005). Computer generated art is, of course, higher quality than the hand-made art of a child. Seeing this comparison, children lose interest in their own art and become frustrated because they cannot create something as perfect as a computer generated drawing.

The same effect can happen with handwriting versus typing. Children at the elementary school level are in a very sensitive stage of building their own self-confidence. A child can have difficulty being proud of his handwritten work when he compares that his letters are not perfectly formed, his words are not perfectly spelled and his illustrations are not perfectly created. Typing a story into a word processing program allows the same child to achieve perfect letter formation, perfect spelling and perfect illustrations with drawing tools and clip art.

Early childhood computer usage is also potentially crippling to the normal development of attention span. Stimulation from a computer program is different than stimulation from a teacher. Too much computer usage conditions the child's body to expect a certain amount of stimulation. Thus, a child may become unmotivated in school (Are These Essential Activities Being Replaced by Technology, 2005). The misuse of rewards in computer games will also

dampen internal motivation to learn. Children become accustomed to being rewarded for getting the right answer with bonus points or rewards in a game. Understanding and solving a problem on their own should be rewarded intrinsically in a student's sense of pride (Healy, 2004).

Children need hands-on experiences with the world and other children to foster proper development of problem-solving skills. Children are not capable of learning these skills through computer games. Children need to manipulate objects like building blocks, clay, finger paints, sand, etc. Tactile-sensory integration types of activities and stimulation are most appropriate for the brain to achieve its full potential (Leonard, 1998). Without such activities, children can lose their ability to analyze and learn from cause and effect. Clicking around with a mouse and a computer screen does not give children the same opportunities for building, designing, and feeling the success of a hands-on creation.

Computers Are Detrimental to Students' Health

Today it is not uncommon to see children of all ages at a computer, whether at home, in school, or even the local library. A visit to any local library allows one to observe younger children, ages three to five, so inept with the computer, keyboard and a mouse. Prior to our research focused on computers, children and their health, we had a lack of awareness of these important issues. There are several different health concerns that parents, educators and children should be aware of before they spend enormous amounts of time playing, learning and surfing on their computers.

Posture Tribulations

When adults as well as children spend long amounts of time sitting in front of their computers, chances are, they are not concentrating on their posture. Members of our group know

that when they have been at their desks for extended periods of time, they experience lower and upper back pain. Well, our children are no different…. Our children are spending increasing amounts of time in front of the computer, and much of the time their posture is incorrect. Parents and teachers tend to neglect correcting children about their posture, as the children do not complain as much, and adults may be unaware. Unfortunately, over extended periods of time, the damage may already be done. It is important to remind our children to try to sit up straight with a ninety-degree angle at both the back and the knees. Also, having children change their positions frequently may help alleviate any discomfort.

Repetitive Stress Injuries

Repetitive Stress Injuries (RSI) result from too much repetition, just as the name implies. "Repetitive stress injuries (RSI) are a group of conditions generally caused by placing too much stress on a joint, and they vary in type and severity. Most repetitive stress injuries are linked to the stress of repetitive motions at the computer or overuse injuries in sports" (Pierson, 2005). Children today are spending greater amounts of time in front of the computer typing and repetitively stressing the same joints. Gaming is a particularly intense culprit for this type of injury. Some of the more common repetitive injuries seen among children are:

- "Carpal tunnel syndrome: swelling inside a narrow "tunnel" formed by bone and ligament in the wrist; the tunnel surrounds nerves that conduct sensory and motor impulses to and from the hand, leading to pain, tingling, and numbness
- Cervical radiculopathy: disk compression in the neck, often caused by repetitive cradling of a phone on the shoulder
- Epicondylitis: elbow soreness often known as "tennis elbow"

- Ganglion cyst: swelling or lump in the wrist resulting from jelly-like substance that has leaked from a joint or tendon sheath
- Reflex sympathetic dystrophy: a condition characterized by dry, swollen hands and loss of muscle control; consistently painful

Tendonitis: tearing and inflammation of tendons connecting bones to muscles"(Pierson, 2005).

If a child does experience RSI, you may need to take them to their pediatrician for an evaluation. The pediatrician may prescribe resting and putting ice on the affected area to try and reduce any swelling and rest to reduce irritation and speed up healing. Fortunately, these conditions can be alleviated through different techniques, such as sitting properly at the computer, maintain a 90-degree angle between the wrists and elbows and the upper part of arms. Fingers and wrists should remain level while typing, and of course taking frequent breaks away from the computer is beneficial for both body and soul.

Computer Vision Syndrome (CVS)

Visual problems among children are on the rise, and a great deal is the direct result of computer use. "Extensive viewing of the computer screen can lead to eye discomfort, fatigue, blurred vision, and headaches"(Anshel, Year Unknown). Eye doctors have seen an increase in the amount of patients they are seeing and diagnosing with Computer Vision Syndrome (CVS).

Computer Vision Syndrome (CVS) is "the complex of eye and vision problems related to near work which are experienced during or related to computer use." The symptoms that

most often accompany this condition are eyestrain, headaches, blurred distance or near vision, dry or red eyes, neck and/or back ache, double vision, and light sensitivity.

The factors that most often contribute to CVS in children are a combination of improper classroom conditions, poor work habits, and existing refractive errors (Anshel, Date Unknown, p. 1).

Many times children do not realize they are straining when it comes to viewing or working at the computer. Children tend to ignore or do not even realize they may have eye problems from straining. It is important to make sure the lighting in the computer area is also sufficient, as poor lighting can lead to headaches, eyestrain, tired eyes, double vision, and red or dry eyes. Aside from parents, educators need to be involved and aware of potential issues which maybe affecting our children's vision when working with computers.

Obesity and Passive Activities

Parents may think that having their children sitting in front of the computer is okay because they are learning. However, recent studies show otherwise. "Kids spending more time on PCs were heavier than kids who spent little or no time on the computer"(Kornblum, 2003). Studies show computers can be valuable in moderation but damaging in excess. As always, parents and educators should be aware of how much time children are spending working on the computer.

Traditional Teaching Without the Use of Computers

"There is no reason to throw the baby out with the bath water; many of the traditional methods of instruction are valid." says Ronda Beaman. Traditional teaching is tried and true. We know what works and how students learn: auditorily, visually and kinesthetically. In the real

world no one works alone and so we must teach and model for our children how to work in a group of colleagues. Business leaders are looking for employees with cognitive abilities and problem solving skills who can work cooperatively with peers. Computer ability alone does not make a more marketable candidate.

"It is within the context of human relationships, play and interactions with nature that we socialize our children," said Dr. Benoit of Howard University Hospital in Washington, D.C. "Premature relegation of learning to computer interaction will rob them of both that civilizing influence and of their innate creativity" (Mokhiber, 2000). It is imperative that we stop jumping forward with technology and take a long hard look at truly meeting the needs of our future generations. Educators need to stay focused on the basic traditions of reading, writing and poke a letter key and then passively watch a letter appear on screen . . . may actually hamper the arithmetic. Colleen Cordes writes in Alliance for Childhood, "Expecting beginning writers to process of learning how to write and read."

Metcognitive abilities are an important factor in helping us to understand how information fits into a larger picture and how to best utilize that information to reach a desired end: in short, to be in control of our learning and its application. "Metacognition refers to higher order of thinking which involves an active control over the cognitive processes engaged in learning. Activities such as planning how to approach a given learning task, learning comprehension, and evaluating progress towards the completion of a task are cognitive in nature" (Livingston). In our school systems, metacognitive ability affects everything in which our children participate from writing an essay to discussions dealing with fellow students.

Problem solving is another skill that needs to be nurtured through traditional instruction.

Take the fact that most school districts throughout our country give written standardized tests that focus on a student's writing ability, creative thoughts and justifications for their answers. If a student uses a computer for these tasks he or she will become dependent on this piece of technology instead of relying on their own talents or merit. Corporations today need graduates who are global thinkers with the ability to work smarter than the competitor. As Thomas Fuchs and Ludger Woessmann stated in their research findings of 174,000 15-year-olds,

> Their results, which are only now starting to make waves among pedagogy experts, confirm what many parents have long intuited: the sheer ubiquity of information technology is getting in the way of learning. Once household income and the wealth of a school's resources are taken out of the equation, teens with the greatest access to computers and the Internet at home and school earn the lowest test scores (Ferguson, 2005).

Teaching students to use their brains analytically, to analyze and catalog information and view concepts with an intrinsic ability is essential in the work force. It is imperative that these skills be developed and encouraged prior to becoming enthralled with technology.

When a student becomes dependent upon using a calculator he or she will lose their knowledge and speed capabilities. Using a computer for core subjects being taught in school will create a disservice for our future generations by enabling them to rely on technology instead of their own abilities. "Computers and the Internet can also distract kids from homework, encourage superficial and uncritical thinking, replace face-to-face interaction between students and teachers, and lead to compulsive behaviour" (Ferguson, 2005). Computers are able to give our students a load of information, but if you speak with educators, they already have a wealth of

readily available information for our students to learn. A teacher can teach students about literature, poetry and even chemistry without using a computer. The abilities of using partners, groups and lots of cooperative learning are what our children need to successfully transition into college or the work force.

Spending on Technology for Schools

Why *do* we spend so much on technology for our schools? There are pressures from parents who want to see computers in every classroom. There are pressures from principals who want budgets that will allow them to purchase the latest interactive multimedia for their schools. There are pressures by communities on School Board members to apply for grants to bring in technology. Ultimately the costs of technology for our public schools cause cutbacks in other pedagogical areas proven to be essential to a good education. In our headlong rush to promote technology in schools above all else, we have lost sight of our students and their needs (Stoll, 1995).

Let us take a hard look at how schools and school districts are spending on technology. In general, technology budgets are spent on things both seen and unseen. What we see initially as a result of technology spending is the hardware and the software plus anti-theft computer security of some sort. Later, generally within four years, we see spending on upgrades to hardware and software. Technology budget items that remain unseen are rewiring of the infrastructure to provide additional power, installation of phone lines, internet access, annual anti-virus software fees, annual blocking software fees, technical support, and teacher training, which is the most important, but most often forgotten budget item (Healy, 1998).

In an article entitled “Fool’s Gold” written by the Alliance for Childhood, it is stated that,

"U.S. public schools spent over $27 billion on computer technology and related services between 1994 and 1999." This is an average of $5.4 billion per year. Annual technology spending by public schools rose to $7.8 billion by 2000 (Cordes, 1999). In another Alliance for Childhood article called "Tech Tonic" it is stated, "Over $55 billion has been spent on computer technology and related services during the ten-year span from 1994 to 2004" (Cordes, 2004). Fifty-five billion dollars; that is an unimaginable sum! In addition, President Bush's No Child Left Behind Act, which takes effect this year (2005), mandates spending another $15 million over the next five years while researching and evaluating the use of computers for instruction in our nation's public school classrooms (Hansen, 2003).

As an individual example of technology spending gone wrong, North Carolina spent seven million dollars to tie 16 high schools together via an interactive video system using a fiber optic network. Using this system one teacher could teach students in four high schools at once. The problem was the total class size of all four schools was limited to thirty, so the teacher could still maintain "personal contact." Twenty-six students signed up. By the end of the first year, over half the students in this program had failed or dropped out. As we mentioned in our introduction, North Carolina spent millions so their students could watch television in school. "What's wrong with this picture?" (Stoll, 1995).

Is Our Spending on Technology Cost Effective?

"What is wrong with this picture?" is indeed the question into which we should look when we spend so much on technology with so little return. During the past seven years, a number of people in various ways have said that technology-based instruction is definitely not cost effective. For example:

- The United States National Science Board in its 1998 report on Science and Engineering Indicators stated it has never been proven that computer-based instruction (CBI) is cost-effective compared to other forms of instruction such as smaller class sizes, peer tutoring, small-group learning, self-paced learning, and in-class tutors (U.S. National Science Board, 1998).
- There was one study that compared the cost effectiveness of technology-based instruction with other more traditional forms of pedagogy such as those mentioned above. That study found that peer tutoring was more cost effective than technology-based instruction (Bloom, 1999).
- In 1999 Colleen Cordes stated, "No one has established how to use technology in ways that actually improve education --- let alone how to do so in a cost-effective, way compared to alternative reforms." (Cordes, 1999).
- Larry Cuban said:

  Certain computer-assisted instructional software for particular basic skills, applied to narrowly prescribed tasks, can raise test scores over a period of time. Beyond such narrowly conceived uses, there is no clear, commanding body of evidence that students' sustained use of multimedia machines, word processing, spreadsheets, and other popular applications has any impact on academic achievement. (Cuban, 2000).
- Saul Rockman is the founder of a San Francisco-based technology education consulting firm called Rockman Et Al. He declared, "No one

> will say, 'Give me technology and I'll guarantee test scores will go up in two years.' The Feds are saying, 'Prove that it makes a difference.' The fact is technology programs don't have the weight to raise test scores." (Hansen, 2003)

- Susan Patrick is the director of the United States Department of Education's Office of Educational Technology. In 2004 she affirmed, "Despite a decade of investment (in educational technology), most achievement indicators are flat." (Branigan, 2004).

Over $55 billion has not been spent in a cost-effective manner. We have not kept our focus on our students and their needs. We ask again, what is wrong with this picture?

Critical Needs in Schools

Our schools have many critical needs that are not always met due to budgetary cutbacks, even as our technology budgets increase. These critical needs are:

- more teachers
- smaller class sizes to allow teachers time to give time and attention to our most challenging and disadvantaged students
- more human resources within the classroom such as teacher aids, mentors, tutors, volunteers, social workers, and counselors
- money to attract and retain the most qualified teachers
- repair and renovation of school buildings
- building new schools to ease overcrowding

- public support for developmentally appropriate educational experiences such as music, art, physical education, school gardens, outdoor school, hands-on science, vocational trade (shop) classes, library books, and field trips
- security, providing all students a safe and orderly place to learn (Cordes,1999)

Technology does not address any of these critical needs; in fact, it pulls needed funds away from already slim budgets. We ask again, what is wrong with this picture? (Stoll, 1995).

Cutbacks to Essentials

Now we come to the heart of the matter. In our headlong rush to jump on the technology bandwagon, we have not thought about the downside of our technology spending spree. To finance our technology expenditures, we cut our general school budgets. Even though it has been proven that art, drama, music, and physical education motivate students, increase brainpower, and support academic curriculum; art rooms and music rooms are being changed into computer labs, physical education classes are being cut, as are library resources and teacher supply budgets (Healy, 1998). There have also been cuts to vocational trade classes and textbook purchases (U.S. National Science Board, 1998).

A Wyoming elementary school teacher stated:

> My school district could be IBM --- you name it, we have it as far as technology is concerned. But I don't have enough textbooks; my kids have to share math books and I couldn't get money to buy a classroom literature set. When I tried to get a small stipend to attend a workshop on student problem-solving, I had to pay for it myself. The district had spent it all on computers! (Healy, 1998)

In 1996 Union City School District in California spent $37 million on technology. Then in 2001 they spent another $5 million to upgrade that technology. In the meantime, enrollment

dropped in the district, and this cost them $6 million in state funding. Naturally this shortfall led to cuts in science equipment, field trips, and so on (Oppenheimer, 2003).

In New York City the school district's technology budget grew apace during the late 1990's, while at the same time the funding for textbooks and other books declined. By 2001, New York City schools were facing a $406 million shortfall. In order to deal with this they laid off administrators, cut after-school programs, and cut arts programs. However, when they made out their budget, it still included $250 million for technology. Clifford Oppenheimer in *The Flickering Mind* says this money could have purchased nine hours of one-on-one tutoring for every student in the city, or five million new textbooks, or 7,800 new teachers which would have meant a ten percent increase in staff (Oppenheimer, 2003).

A Pittsburgh school district faced a $37 million shortfall in 2000. In Pennsylvania, as well as in many other states, there is a law which states that a school district may not operate in the red. Because of this law, Pittsburgh cut spending on teachers and supplies, closed twelve elementary schools (increasing enrollment at the remaining schools), and raised taxes by twenty percent. However, they did not do without their computer upgrades (Oppenheimer, 2003).

As the economy faltered early in the twenty-first century, school funding shrank. In response, northern California school districts closed elementary schools, laid off teachers, froze salaries, added students to already crowded classrooms, and cut music and other arts classes. However, they did not cut the technology budgets (Oppenheimer, 2003).

Teacher Workloads and Computers

Technology has become increasingly popular in schools today, but can everyone explain why and how the technology is being used? Schools are buying the technology and expecting teachers to use it without explanations. Most schools today are set-up with poor communication

systems. Someone in the school decides technology should be used and it is purchased, but there is a lack of clear expectations of use, as well as, of training.

Technology brings on a whole new meaning to teachers; more work! Teacher workloads have increased over the past few decades and continue to do so. Technology has been coined as another addition to the workload. Schools are buying technology and then putting pressure on the teachers to use it. Since teachers do not have time for the extra work they stick kids in front of the computer for busy work rather than anything sophisticated. As Kashmanian (2005) states,

> The 'why' of educational practices needs to be considered before jumping blindly onto the computer bandwagon. Technology should allow students to do what they could never do before in classrooms: design system models, run simulations, research topics on the internet, join in global communication, and manage information in non-linear ways. But 'technology for technology sake' should not be tolerated.

Virtually all discussion of the role of technology in schools is focused on two very short-term objectives:

1. Improving existing school practices, including the teaching of the current content.
2. Introducing very elementary forms of 'computer literacy' or 'technological fluency' in the form of vocational knowledge justified by being needed in the workplace.

As quoted in Papert (2005), Oppenheimer, in an article in the *Atlantic Journal* stated that the goals were too narrow and "there is no good evidence that most uses of computers [in present day schools] significantly improve learning and teaching." In fact, the Milken Exchange, did

some research on the effects of technology. In the Apple Classrooms of Tomorrow (ACOT) study, standardized tests measured vocabulary, reading comprehension, mathematical concepts and work study. ACOT students performed no better than comparison groups or nationally reported norms. Schacter also collected data on Harold Wenglinsky's National Study on the impact of technology in math. The study tested simulation and higher order thinking. The results showed:

- 8th graders who used simulation and higher order thinking software showed gains 15 weeks above level as measured by NAEP
- Teachers who received professional development training on technology had students who scored 13 weeks above level as measured by NAEP
- 4th graders who used technology to play learning games and develop higher order thinking performed 3 to 5 weeks ahead of students who did not
- 4th and 8th graders who used drill and practice technology performed worse compared to students who didn't use technology for the same reasons, as measured by NAEP

Although the above indicates some positive findings, those circumstances necessary to lead to a positive impact were not prominent in most schools. If technology is used correctly it is possible to make a difference, but the percentage of correct use is so small. As stated in Papert's (2005) article, *Technology in Schools to Support the System or Render it Obsolete*, the Milken Exchange on Educational Technology states "good things that happen in **some** schools, but not **most** schools."

Why do some schools have a positive impact from technology, while most schools have no impact or a negative impact? Teachers are expected to take on the major role of implementing technology into the curriculum. As described above this can be a difficult process for teachers because of increased workload, lack of professional development, and pedagogical factors. Teachers are reluctant to use technology in the classroom due to time. Krysa (1998) reports,

> Teachers who have taught with computers agree that - at least initially - most uses of computers make teaching more challenging. Individualized lessons, matching software to curriculum, scheduling student computer time, monitoring use, providing assistance, and troubleshooting - all adds burdens to the teacher's time...The net effect is increased demand on teacher's time and creativity...very few teachers have adequate time for planning and preparing to use technology.

As it is few teachers have an appropriate amount of time for other teaching details. When technology is added on it makes it virtually impossible. The equipment available in the school also makes it difficult for teachers. They have to find the right time to use the equipment and then hope that it is sufficient for what they need. As quoted in Krysa (1998), when Middleton, Flores and Knaupp (1997) surveyed teachers they found that teachers,

> View the hardware factor as an accessibility barrier. They contend that computer labs are an effective strategy for reducing the student-to-computer ratio in schools. However, the competition between teachers for blocks of time in the computer lab may result in some teachers giving up on scheduling time in the computer lab and thereby ceasing to implement computers in instruction. They also contend that the accessibility to computer hardware may also be dictated by the subject being taught. In some instances, the

physical location of computers and the students needing access to them will act as a barrier to teachers implementing the technology.

When large numbers of computers are in a room separate from classrooms, many students get hands-on experience occasionally, but no one gets to use the computer in a truly authentic way--that is, the way a scientist or mathematician might use it to solve a difficult, time consuming problem. In order to be true tools for learning, computers need to be on hand when the need arises, not next week when the lab is open (Krysa, 1998).

Lack of support by administrators is identified as another barrier in implementing technology in a way that will impact student learning in a positive manner. Administrators should be offering support and leadership to teachers, as well as, adequate professional development opportunities. Unfortunately, this is not the norm. Administrators need to:

- establish flexible schedules so teachers can practice what they have learned (or to continue their learning);
- encourage and facilitate team teaching and peer coaching
- allow teachers to visit each other's classrooms to observe computer technology integration; and
- schedule regular meetings among teachers using technology to plan and evaluate instruction. (Krysa, 1998)

Teachers that have been in the profession for awhile, most often lack the technology skills necessary to implement computers into their curriculum. At the same time, teachers who are entering the profession have had no training in technology, thus, creating a huge need for

professional development. Teachers need to know how to use computers first before they can integrate them.

The Office of Technology Assessment Report (As stated in Krysa, 1998, cited in Geisert and Futrell, 1995) was written for the U. S. Congress to provide federal policy-makers an information base for making long-term decisions about computers in education. The OTA Report states that technologies have the potential to enrich the teaching and learning process but only under certain related conditions:

- adequate teacher training in the skills needed to operate the technology
- a clear vision and understanding among educators of state-of-the-art development and applications
- support for experimentation and innovation
- time for learning and practice

Based on the studies and education systems today it is clear that the conditions above may occur in some schools, but do not occur in most schools. So what happens when teachers face the time, equipment, and lack of support, but are still pressured to use the computers? They do! Teachers use the computers for drill and skill or point and click games. As stated above, these types of uses negatively impact the students. As long as schools confine technology to simply **improving** what they are doing rather than **really changing** the system, nothing very significant will happen (Papert, 2005).

In *Failure to Connect: How Computers Affect Our Children's Minds – for Better and Worse* Healy states, "While some very exciting and potentially valuable things are happening

between children and computers, we are currently spending far too much money with too little thought. It is past time to pause, reflect, and ask some probing questions. The appropriate questions include: Are computers being used in age-appropriate ways? Are all developmental needs of children being addressed? Is sufficient teacher training in technology taking place? Is "learning software" really what it states, or is it simply "edutainment," reinforcing impulsive point and click behavior in pursuit of a trivial goal?

Conclusion

Study after study indicates only marginal positive impacts of technology on learning. The strongest arguments come from anecdotal stories of students engaged by uses of multi-media in education. It is an unfounded leap in judgment to claim effectiveness and credible learning gains based on these anecdotal vignettes. There are many compelling arguments for a serious retrenchment of resources used to fund instructional computer technologies. Health risks, usage appropriate for developmental needs of children, socialization and communication skills, interpersonal understandings and abilities, negative impacts of loss of creative opportunities, diversion of essential resources to pay for the high costs to develop and maintain technology infrastructures and personnel, and the net loss of quality time stolen from meaningful moments with family, pets, neighbors, and friends.

Harold Wenglinsky, highlighted a critical and yet often overlooked dimension in the efficacy of instructional technologies; quality of usage is the single most important impact on measurable student outcomes (1998). Millons upon millions of dollars have been spent for equipment that teachers are not prepared to use in instructionally appropriate ways. This reality results in use of classroom technology for individual classroom management diversions, edutainment opportunities once the "real" work has been completed, and rote drill and practice computer use.

These uses actually seemed to harm 14,000 U.S. fourth and eighth grade students' test performance based upon Wenglinsky's 1996 examination and subsequent study findings (1998).

Kleiman, focused on technology and its impact on education (2000). His conclusion was the education system is not ready to adopt a new curriculum style. "Teachers are not ready to use the technology." It is hard for teachers to introduce technology into the existing teaching curriculums. Based on these results and observations, it is easy to follow Waxman and Huang who found teachers primarily using whole class (traditional) instructional methods which do not lend themselves toward more constructivist approaches to instruction, required of teachers making strides toward inclusion of computers in their classrooms (1996). They mostly do not possess the necessary skills to use the new technology. The technical support is often limited, and teachers often find themselves lacking the software that supports major curriculum goals." Wenglinsky, quite simply states, "it is not how often you use it, it is how you use it" (1998). Additionally, advancements in technology and its uses are far outstripping the average teacher's foundational knowledge and abilities (Allen, 2001). Every step forward made by teachers is three steps back in keeping up with the exponential advancements in technologies.

The public, at large, can carry misconceptions about education that harm the education process. Computer access alone will not cure the ills of our nation's classrooms. Nor will computers teach our children how to be role models, engaged citizens, and caring community volunteers.

A computer in every classroom will not guarantee effective learning or a cutting-edge citizenry. Computers and other instructional technologies in a classroom are no more effective than is a mechanic's toolbox left unused in the corner of the garage. Rightly, U.S. citizens deserve to expect the best uses of their tax dollars in the education of their nation's children. It is

harmful to our schools and feeds a lack of respect for teachers when the billions of dollars spent on technology do not reap expected results.

As we have seen, none of the research completed to date has been able to support the idea that computers and technology improve student achievement, yet we continue to spend billions of dollars on technology. Those billions represent money that is not available to be spent on music, art, libraries, and other critical needs of our schools (Ravitch, 1998). We should not be investing our public school dollars in technology. We should be investing in our children, using time-tested, proven methods of pedagogy; rather than investing in technology which stands a strong chance of being outdated in three to four years. Steve Wentland, a teacher in Belridge School District said, "Ninety percent of what a kid learns he learns from the teacher" (Oppenheimer, 2003). Gary Bloom in "Doorstops… or Deliverance?" said, "Remember that the relationship between teacher and student is at the heart of (teaching). Nothing that comes out of a cardboard box is likely to change that anytime soon" (Bloom, 1999).

Please take a moment to reflect and answer the following two questions:

- Can you name three multi-media programs that actually inspired you?
- Can you name three teachers who made a difference in your life? (Stoll, 1995)

Which question was easier for you to answer? Which would you like your children to be able to answer? The next step is clear. We need to redirect those technology dollars back to areas of critical need in our schools to support traditional pedagogy. When critical needs are met, gains will be obtained in student achievement, and we will be producing problem-solving students.

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