

Computers and Education

The Wrong Approach Continually Being Executed

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Thesis and Introduction

Computers are an amazing tool. They are only second to the human mind as a tool for processing information, and they can transmit more types of information at this time than any other device previously created. Every industry in the United States is using computers in some capacity.

Yet, with over an estimated 100 billion dollars spent on computers for schools since 1990, I believe that the tool of the computer is underutilized and has not fulfilled most of the educational promises attributed to the tool. (p. 416, Oppenheimer, 2003) I will present facts that support this belief.

While this paper will focus primarily on the problems with how computers have been implemented in our school system, with emphasis on Adult and/or Vocational Education, future papers will be about solutions to these problems and techniques teachers and our educational system can use to use the tool of computers and technology in general to improve upon the learning process. But it is important to understand and have people be aware of the problems before change and improvement can occur. I am not convinced that most people really are aware of the problems, even though they are blaring.

In fact, this paper is really not a final draft. I have been working and thinking actively about how to better use computers in education for the past 3 years, and for the past several months have intensively been reading on the subject and doing interviews of Grant Adult Education teachers in regards to technology usage in the classroom. I will continue to do this after this class is over because I am doing it as part of my overall goal of improving our education system, in at least one tangible area, where I think I may be able to make an impact.

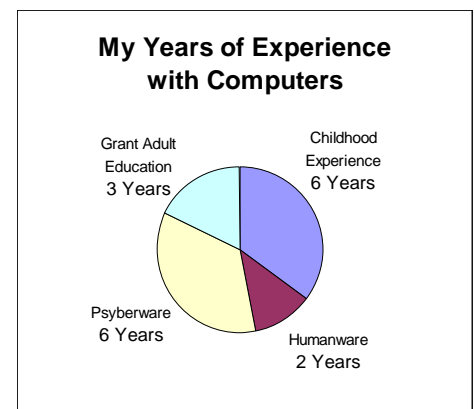
The literature I have been reading includes both those that have the perspective that “Technology is wonderful for schools” and those that say “Technology is terrible for or has been implemented terribly in schools”. Most of this literature focuses on the K-12 system, and does not address the needs of adult or vocational education. I hope to be able to fill some of this gap with my own experience and, hopefully, more literature and data as time goes on.

This paper and several of the other papers I have done for the EDS classes are the beginnings of what will probably ultimately become my master’s thesis. I also hope to have the opportunity to instruct more teachers on the use of computers, both with the Grant Joint Union High School District, as well as potentially in the BVE program, or other teaching credential or related programs at CSUS.

My Background with Computers and Education

Before I start on the topic at hand, you should be aware of the following information about me and my background with computers and education:

1. I have been using computers since I was about 12 years old (I am 29 now).
I grew up with computers, and much of who I am today can be attributed to these tools.
2. I have *effectively* been teaching computers for over 10 years.
 - Over 8 of those years were doing technical support, where I would not only help answer questions, but nearly always made an effort to educate the end-user in the process.
 - 2 of these years I worked for a company name Humanware, which sold adaptive technology for the blind to use computers.
 - 6 of these years I worked for an Internet Provider named Psyberware, where I was a founding employee and lead technician. This was the first Internet provider to exist in Placer County. I am still on the board of directors of the small corporation.
 - I now have spent over 3 years teaching both basic computer skills and technician skills with the Grant Adult Education program. I also have taught several in-service classes for other instructors of the Adult Education program.



I mention this information because, on any topic, I believe work can be more objectively presented if some of the potential biases and the background of the author are known. I am a technician who became an educator. BUT, I have been interested in education and thinking about how education works since the time I was in High School, and I had several excellent teachers by my standards.

Proof that the Problem Exists

In 1996, the *San Jose Mercury News* did a report on whether or not technology improved education in the K-12 environment. They examined test scores of 227 schools throughout the state of California. 10% of these were “model technology” schools, schools in which large grants were won for intensive technology programs. The paper concluded from their study that “In general, the analysis showed no strong link between the presence of technology – or the use of technology in teaching – and superior achievement.”

There were two exceptions to a nearly flat correlation: one high technology school performed much better than average, and another high technology school performed far worse than the average. (p. 391, Oppenheimer, 2003)

To me, this emphasizes that technology has promise to improve education, but the implementation of it, in general, has not improved our educational system.

Beyond this survey, Todd Oppenheimer in his book *The Flickering Mind* and Larry Cuban in his book *Oversold & Underused* present many examples of where computers have failed, on the whole, to live up to the hype. Neither author is a Luddite in their research.

Todd Oppenheimer opens his book with a success story of technology, and it was not until he started experiencing how technology was used in education that he questioned how effective it has been. (Oppenheimer, 2003).

Larry Cuban is a Professor of Education at Stanford University and was a past president of the American Educational Research Association. His approach was to study the use of computers in the schools of Silicon Valley. He attempted to be as objective as possible, using good research methods. (Cuban, 2001)

I have not yet finished reading all the “success stories” of technology as I would like, so I may not know of other statistics that show how technology can improve education. But the “success story” literature I have read has focused on individual successes in a small or controlled environment and not how computers have impacted our entire educational system. These success stories also don’t address whether technology was more of a key feature of the success than the general change in teaching style, to a project or constructivist based learning environment, which usually accompanied the use of computers, or whether the computer was more effective for the money spent than other means, such as reducing class sizes.

I could not find any studies about the effect of technology on adult or vocational programs, although *Oversold & Underused* discussed the use of computers at Stanford University and the effect they had. It concluded, “The outcomes that emerged in preschool and K-12 public schools were matched in higher education: the availability of information technologies in classrooms increased dramatically, yet teachers used them infrequently and altered their conventional forms of teaching very little” (p. 103, Cuban, 2001).

Also, in *The American College Teacher: National Norms for the 1998-1999 HERI Faculty Survey*, which sampled 829 randomly selected professors throughout the nation, with a 79 percent return of questionnaires, found that only 17% of the professors used computer/machine-aided instruction in Most or All of their courses. (p. 106, Cuban, 2001)

My personal experience with computer usage in Grant Adult Education, as being one of the primary technicians and a computer instructor, has made me believe that, for the most part, our past investments in computers and how those investments have, thus far, been implemented have not improved education more than other investments could have, although I do feel that if variables were different, computers can be a resource and tool that can dramatically aid in the learning process.

A notable exception in my experience to an Adult oriented educational program that does use technology is the BVE classes. Since the move to Napa Hall, every teacher in every class I have participated in has used technology in the classroom. Primarily this has been through PowerPoint presentations and videos.

I have personally found the videos to be effective, which can bring material in which would not otherwise be possible. PowerPoint presentations are more entertaining than traditional overhead projectors. Although other than in the time savings that may occur in creating a PowerPoint presentation and the ability for the instructor to more easily include charts, I have not seen a significant improvement in the educational value of PowerPoint presentations in comparison to the traditional overhead projector.

Reasons Why Computers are Poorly Implemented in Schools

So why have computers not revolutionized education? Why with all the investment that has occurred, has there not been greater success with the tools?

Cuban and Oppenheimer came to several conclusions about this, with some overlap. I too have my own opinions and conclusions about why computers have not improved our educational system dramatically.

1. The Computer Itself

There is an urban legend that has been circulating the Internet since about 1997 that goes something like the following:

At a computer expo (COMDEX), Bill Gates reportedly compared the computer industry with the auto industry and stated: "If GM had kept up with the technology like the computer industry has, we would all be driving \$25.00 cars that got 1,000 miles to the gallon."

In response to Bill's comments, General Motors issued a press release (by Mr. Welch himself) stating:

If GM had developed technology like Microsoft, we would all be driving cars with the following characteristics:

1. For no reason at all, your car would crash twice a day.
2. Every time they repainted the lines on the road, you would have to buy a new car.
3. Occasionally, executing a manoeuvre [sic] such as a left-turn would cause your car to shut down and refuse to restart, and you would have to reinstall the engine.
4. When your car died on the freeway for no reason, you would just accept this, restart and drive on.
5. Only one person at a time could use the car, unless you bought 'Car95' or 'CarNT', and then added more seats.
6. Apple would make a car powered by the sun, reliable, five times as fast, and twice as easy to drive, but would run on only five per cent of the roads.
7. Oil, water temperature and alternator warning lights would be replaced by a single 'general car default' warning light.
8. New seats would force every-one to have the same size butt.
9. The airbag would say 'Are you sure?' before going off.
10. Occasionally, for no reason, your car would lock you out and refuse to let you in until you simultaneously lifted the door handle, turned the key, and grabbed the radio antenna.
11. GM would require all car buyers to also purchase a deluxe set of road maps from Rand-McNally (a subsidiary of GM), even though they neither need them nor want them. Trying to delete this option would immediately cause the car's performance to diminish by 50 per cent or more. Moreover, GM would become a target for investigation by the Justice Department.
12. Every time GM introduced a new model, car buyers would have to learn how to drive all over again because none of the controls would operate in the same manner as the old car.
13. You would press the 'start' button to shut off the engine.

(Mikkelson, 2002)

I want to make clear, that the previous information is not accurate. There is no proof that Bill Gates or the head of GM ever said any of the previous information. And in fact Jack Smith and not Jack Welch was the CEO of GM. (Mikkelson, 2002)

Although, even given that the information about who is credited with this joke is inaccurate, anyone who has used a computer is likely to get a chuckle from it, because many of the analogies and inferences made strike pretty close to home.

In my opinion, compared to most other technologies used by the masses the personal computer

- is one of the most unreliable.
- has a larger learning curve.
- changes quicker in how it operates
- has less standards and is more proprietary
- is harder for the user diagnose or fix when the technology breaks
- requires more continual purchasing of new technology on a shorter timeframe
- has the least percentage of operators that can operate it at a basic proficiency level

They are also one of the most powerful tools that exist, where any individual can have a huge impact upon the world as a whole, and they are being integrated into every facet of America's society.

While I do not currently have data to substantiate these claims, I believe in the future I will be able to provide accurate objective data that can support them. (And if I can not, I will change my opinion.)

Assuming I am correct in my belief about computers, this has profound implications for society as a whole. It also has a huge impact upon how personal computers are used in education, and why it has been difficult to implement computers as a tool for education.

Both *Oversold & Underused* and *The Flickering Mind* document over and over where teachers can not use the computers because the computers are not working. But even the "success story" book *Teaching with Technology* which documents the Apple Classrooms of Tomorrow (ACOT) project by Apple computers says "ACOT teachers encountered numerous technical problems because of the amount of equipment they dealt with every day. Technical problems upset both their daily and long-range plans and, over the years, were the source of most their problems." (p. 60, Sandholtz, 1997)

Beyond the ordinary problems that computers often have, the quality of educational software on the whole is very poor, and has not improved greatly.

In 1983 the Educational Products Information Exchange in conjunction with *Consumer Reports*, said that only ¼ of the products they reviewed got a score of 60% or better on their scale. In 1997, Juddah Schwartz, co-director at the time of Harvard's Educational Technology Center said that 99% of educational software programs are "terrible, really terrible". (p. 26, Oppenheimer, 2003)

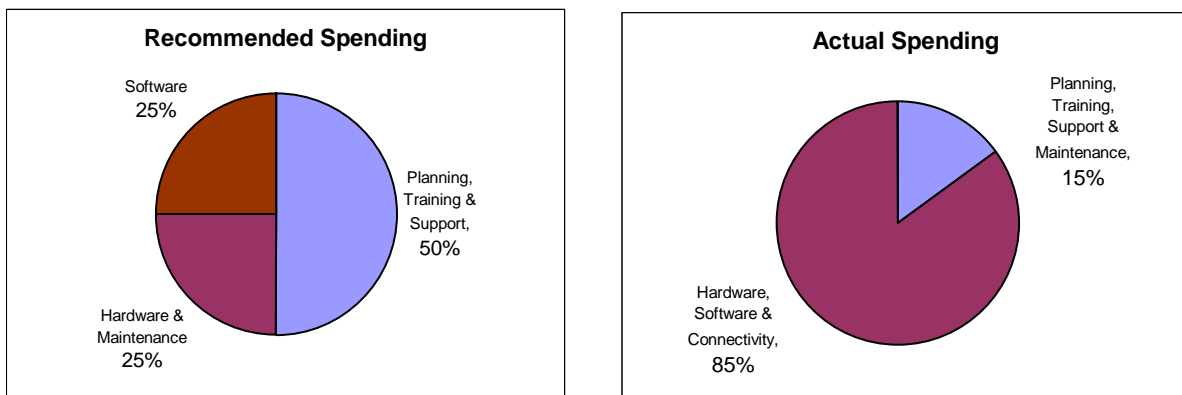
2. Not Enough Quality Technical Support

Given that currently, by nature, computers are unreliable and that the average individual can not do most repairs on one, in order to have them be a successful tool, a large body of qualified technical support must exist to fix problems when they come up.

Marc Tucker, a Washington, D.C., analyst of classroom computer policies suggests that schools should budget as follows:

- 50% on planning, teacher training, and other support services
- 25% on software
- 25% on hardware and maintenance

But in reality the majority of schools spend no more than 10 to 15 percent on both maintenance and training. (p.27, Oppenheimer, 2003)

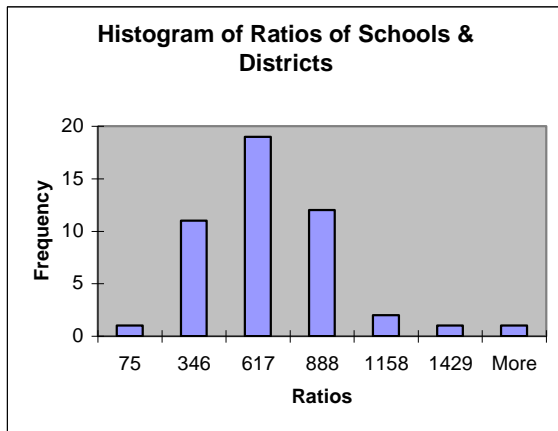


It should be noted that in the above pie charts, the Actual Spending chart combines planning, training, & support with maintenance. In the recommendation chart maintenance is included with hardware, so in reality the recommended chart should have over 50% devoted to the category that ends up being only 15%. Also the recommendation does not address network connectivity. I included connectivity as part of the actual chart.

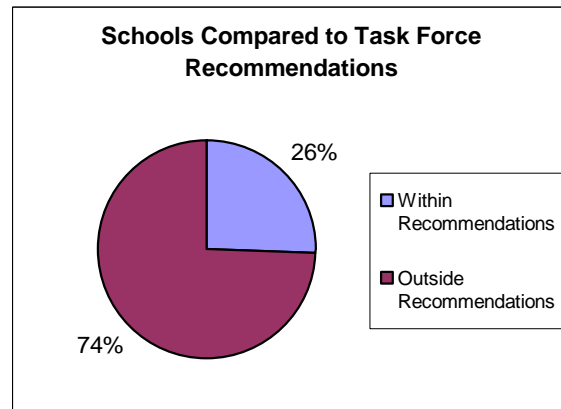
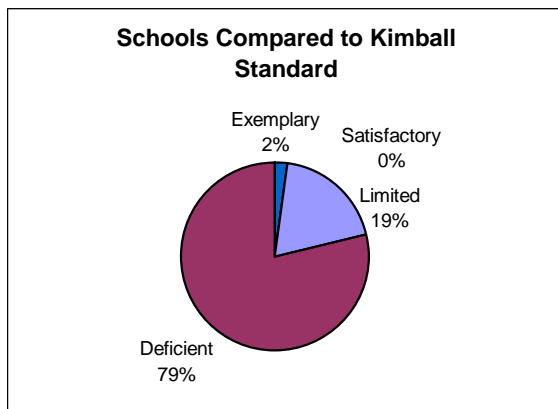
Looking at the actual number of technicians that serve a group of computers is another useful statistic in order to determine quality of support. According to the Technology Support Index by Dr. Chip Kimball (funded by the Bill and Melinda Gates Foundation) “Satisfactory Support Capacity and Efficiency” requires having a ratio of 150 computers to 1 technician or less. “Deficient Support Capacity and Efficiency” occurs at 250 computers to 1 technician or more. The California Department of Education Technology Task Force recommends a more conservative ratio of 300 computers to one technician or less.(Coachella Valley Unified School District, 2002)

According to the Gaston County Schools Educational Technology plan, which cites a Gartner Group report from 1999, “Currently business and industry support their technical infrastructure at a ratio of one technical support person to 50 computers.” (Gartner Group, 1999) I found many websites that used a variety of “industry standard” statistics for the computer to technician ratio, ranging from 30 to 1 to 300 to 1, but none of these websites cited where their information was obtained from.

I searched using Google (www.google.com) to find out what different school districts and schools had as their computer to technician ratio. In all I found 47 schools or districts that listed this information on the Internet. The median ratio was 550 to 1. The following is a histogram of the frequency of the different ratios:



The following two pie charts compare the ratios to the two standards I have mentioned:



As you can see from these charts, given either of the standards about $\frac{3}{4}$ of the schools sampled do not have enough technicians. It is even more telling that no school found from my data was in the “Satisfactory” category, and only 1 was “Exemplanary” by the Kimball standard. Please see Appendix A for a complete listing of my data and the websites I used to obtain the data.

It should be noted that for my small unscientific study, Schools and School districts were compared side by side as being one and the same, and also the size of a school or district was not taken into account. In the future I hope to go back through my data and be able to correlate it to other factors that each district or school may have such as population size, median household income, etc. But I did not have the time to do this to complete this assignment before it was due.

The other problem that I see personally with technical support in our school system is that while in my experience, the support staff generally is knowledgeable about computers they are generally not knowledgeable about teaching. Further many of them are not passionate about helping the end user (both the teacher and the student).

There of course are exceptions to this, as I personally believe I am one, and I have dealt with other technicians in school systems that are genuinely passionate about education, but they are the exception in my experience.

One example of a technician that I do not feel is passionate about education came from talking to a former lead technician with the Grant Joint Union High School district. I asked him about how to operate one of the major pieces of software that is being implemented throughout our district. His response was basically: "Why do you want to know how to do that?"

While my experience is limited primarily to the district I am in, I suspect this is not an uncommon attitude. Although part of this attitude may stem from the fact that most school technicians are so overloaded that they do not have time to be concerned with anything but having the hardware and software working.

Lack of technicians also means that technology is often delayed in being installed. This means that computers often sit on the shelf instead of being used, the whole time depreciating at a far greater rate than most types of equipment.

3. Not Enough Teacher Education

While having enough quality technicians is important given the nature of computers, it is even more important that teachers know how to use their computers, and can solve problems that may occur with a computer without needing a technician.

Unfortunately, it is my opinion, that many problems do require a technician or a fairly advanced user to solve, but there are many basic problems, and basic maintenance that instructors and other general school staff could do on their computers. It is also critical that instructors receive training in the specific software they are using.

If you look back at how much money has been spent on teacher training (see previous charts), you will find it is completely lacking. Since I already discussed this point, I won't talk about it at length, but I want to make clear that lack of budgeting for training is one of the key reasons according to all the research I have found and my own experience why computers have failed to produce better education. This is one reason why California is putting a huge emphasis on staff technological development, and technology plans need to include a large chunk of money dedicated to this.

Further, it has been my experience, that the way teacher training is often done, is not effective. For example, most teacher in-services are a one day type of situation, where there is no follow up afterwards, and no clear practice is given. Also, when teachers are taught as a group, there is a problem with breadth of skill levels. Those who are not very skilled with computer systems don't often want others to know that they are not very skilled. This is even more of a problem with administration.

This often leads them, in my experience, to not take classes (and they are the ones who need them the most), or if they do take a class, are afraid to ask questions. It is also challenging for any computer instructor to find a happy medium between the quick and slow students, and computer classes probably have this skill disparity greater than most other vocational classes.

Also, at least in the adult education program I work for, teachers have been resistant to take in-service trainings unless they are paid for them at their teaching rate.

4. Lack of Curriculum and Lack of Time to Create Curriculum

According to Cuban (2001) when looking at surveys of Stanford Teaching Staff "Repeatedly, faculty indicated a strong interest, even enthusiasm, for using new technologies but cited as reasons for not making any headway the lack of time to learn how to use computers well and develop software."

From the few interviews I have done with Grant Adult Education instructors, having time to create curriculum in general was scarce, and time to learn how to do it by incorporating a computer was doubly difficult.

Again, the very clear pie charts that show what portion of funds are recommended to such activities as curriculum development, along with planning, etc, and what actually happens shows why the lack of curriculum is part of the problem.

To be fair, there is a growing amount of computer based curriculum that is being developed. OTAN (www.otan.us) contains curriculum and activities with computers for adult and vocational education, and MIT's OpenCourseware attempts to share not only computer based curriculum but a variety of curriculum in general. (<http://ocw.mit.edu>)

5. Decisions made by the Uninformed, with Poor Data.

Imagine the superintendent of school district buying a new fleet of busses without ever consulting the transportation department or the mechanics. Imagine further that those who are making the decision about the busses do not have the data about the gas mileage of the new busses, or the average cost of repair, or mean time between failures. Imagine, even worse, the decision makers might not understand what exactly gas mileage is. It should be obvious that the chances of having a good decision made in the above scenario are slim to none.

Yet, this type of decision making does occur all the time with computers. I have seen personally situations in which neither the IT department, nor any internal technicians were involved in making very large decisions in software purchases that have affected all of Grant Adult Education and/or all of the Grant Joint Union High School District. Many of these decisions also

did not involve many teachers. And when teachers or technicians have been involved, due to the lack of funding in general for technician time, and outside of work teacher work, not a lot of time often was given to the decision on their part.

Both *The Flickering Mind* and *Oversold and Underused* document many cases where teachers were not involved in the purchase of technology. They do not document as much the fact that often technicians are not even involved.

I will once again refer back to the recommendation of Marc Tucker, and my previous charts. 50% of funds in his opinion should be dedicated to “Planning, Training & Support”. With proper planning and time, energy and money taken to make a good decision then the need for support decreases, because software and hardware will more likely be purchased that does not require as much support, and hopefully that is easier to use. Also, with more involvement of the stakeholders, they all, especially the teachers, will be more likely to use whatever was purchased.

6. School District Technology Purchasing Processes

I will blame part of the poor decision making on how the purchasing process happens in schools. While I don't know if the following is systemic of the whole school system or not, I do know the following is a very common pattern where I am employed. Purchasing decisions are routinely made at the last minute. This is partly due, in my opinion, to a general human tendency of procrastination, and partly due to some internal personnel issues, which may or may not exist in other districts. But I would not be surprised if other adult education programs or districts are similar.

What compounds the problem is that we can not “save money” for next year. The grants we receive almost always dictate that the money must be spent by X date. So when X date comes around, we are running around like chickens with our heads cut off trying to make a decision. Good decisions rarely can be made when one is rushed.

Another major problem is that schools are notorious for being inflexible in how they purchase things. From working for a private Internet Provider I know that all the school accounts we had were often late in payment. I do not know how the school district I work for is on this subject. I also know that it is nearly impossible to buy used or refurbished equipment. (There are arguments on both sides on whether purchasing used or refurbished equipment in the end is a good investment or not)

7. Not Considering Alternatives or What Solution is Best for the Situation

The glitz of technology is easy to get into the eyes. “Any sufficiently advanced technology is indistinguishable from magic,” wrote Arthur C. Clark (1961). We are often spellbound by what computers can do, because they can do a lot. This often leads people to making decisions without looking at all the possibilities, or at least other possibilities.

For example, after attending the CATESOL conference, one of our instructional staff came to me talking about an ESL program that allowed an instructor to put words on a “smart board” (A touch screen combined with a projector), so that students could come up to the board and move words into sentences. She was very excited about this possibility, and I personally can see the educational benefits.

But I had to ask myself, and I think she should ask herself: is that computer program, and all the costs involved in getting it, both hardware and software, better or more effective than getting every single ESL student their own refrigerator magnet set, or making our own, or just moving cut out pieces of paper on a board? Sure, it is amazing that we have technology that can allow us to duplicate a refrigerator magnet set, but does that mean it is better than a refrigerator magnet set? I’m not sure.

Many sales people buy into their own spiel about why a software package or other technology is so wonderful; often also not really realizing themselves that it might not be the best solution. (p. 402, Oppenheimer, 2003) But beyond this, there are many instances where profit motivation in the private sector has come ahead of the true educational value of computers, software and other technologies.

8. Self Serving Interests of the Private Sector

The history of computers and other technology in schools is filled with stories of the private sector preying on schools, delivering huge promises but not the goods. Some of these instances can be counted simply as smart business or honest mistakes, but I am convinced that there have been many instances of unethical deals and sometimes outright fraud.

This unethical and/or extremely self-serving activity is not new. In 1983 at least 8 corporations were attempting to push through congress various tax credit bills, including Apple computer who was asking for a 200% tax write off for every computer donated. (p. 36, Oppenheimer, 2003)

And this behavior has not gone away, in fact it may be worse now. This is shown very clearly with the recent discovery of how much abuse is happening in the E-Rate program.

The E-Rate program is a \$2.25 billion dollar initiative supported by telephone taxes to help schools and libraries connect to the Internet. This program is now involved in an ongoing federal investigation.

According to U.S. Rep Joe Barton (R-Tex), chairman of the Energy and Commerce Committee, "The mismanagement of the E-rate program seems to know few bounds. Unscrupulous vendors have fleeced the program while underserved communities and telephone customers are paying the price. The FCC, these merchants and certain schools all must share in the blame for this disgrace." Even such well known companies as NEC have pleaded guilty to criminal charges. (Mark, 2005)

Solutions

While many of the reasons that I have listed have obvious solutions built into them, such as apportioning money better for planning, support and training, or using more resources to make better decisions. I would like to recommend some other novel solutions that may improve the situation.

Small Ongoing Tutorial Sessions instead of 1 Day In-service Trainings

If teachers were to be taught individually or in small groups on an ongoing basis, the chance of success, in my opinion, would be far greater than with the systems that are usually used.

The reason for this is because small groups would allow the pairing of teachers who are on similar levels with similar needs. The training could be more specific to the direct needs of those teachers. (Similar to the “Just In Time Training” that is gaining popularity)

The expense would be more, but if proper portions of money were divided out to staff development, then it should be possible to fund this. Also, these training sessions would be short, and ongoing, to improve retention.

Embedded Technicians

One of the large problems I see with technicians is that they are not involved directly with the end user, or the teacher. They don't have much understanding or buy-in to what is being taught. This does not make for good support.

I recommend that technicians be hired not just as general technicians, but as technical specialists, and be placed in a single department, such as ESL, or a ASE, or a specific vocation, where they would work hand in hand with the instructors and administration on making decisions about technology. They would also set up the technology, be directly involved in training the staff, maintain the technology, and fix it when there is a problem. This gives one central person to contact when there is a problem, and that person would be an expert not only in computers, but also have some understanding of the problem at hand. This person would also have a direct relationship with the instructors, and likely the students as well, which I believe would, in general, make for better results.

While most technicians won't have the cross skill of the subject area they are embedded in, by working with the instructors, they can gain most of the understanding they need.

Conclusion

As implemented in general, computer technology has not been a success in our education system. I personally believe that computers are an amazing tool, and if used properly, for the proper application they can enhance learning, but in and of themselves they are not the miracle that many reformers have led us to believe. Future papers and research of mine will attempt to state more about how these amazing devices can truly be an effective tool in our education system, and maybe those papers along with this one, and the primary sources for this paper, will make an impact for the better.

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Appendix A – Computer to Technician Ratio Data

Technician to Computer Ratio Data		
Information retrieved from Google searching for: "computer to technician ratio" schools and "technician to computer ratio" schools		
School	Ratio	URL
Pontiac	75	http://www.pontiac.k12.mi.us/downloads/AboutPSD/technologyplan20022005.pdf
Akron Central	175	http://www.akronschoools.org/District/Technology/Tech%20Plan/Akron%20Technology%20Plan%20.doc
Gooding	191	http://www2.state.id.us/ope/Reports/rept0501.pdf
Corning Union Elementery	198	http://www.cuesd.tehama.k12.ca.us/maywood/tact/techplan.pdf
Umatilla	200	http://www.umatilla.k12.or.us/technology/Tech_plan.htm
Empire Union	230	http://www.empire.k12.ca.us/docs/EUSDTEch2002.pdf
Hillsboro	230	http://www.hillsboro.k12.mo.us/dc/tap0306/tap_2003_2006.pdf
Rosedale Union	240	http://www.rosedale.k12.ca.us/tech/techplan.pdf
Watertown Public Schools	245	http://www.watertown.k12.ma.us/techplan/WPS5YrTechPlan.pdf
MSAD #50	250	http://www.msad50.org/to/techplan/techplan04-07f.html
South Fork Union	300	http://wwwstatic.kern.org/gems/southforkschool/TechPlan.pdf
WCDSB	300	http://www.wcdsb.edu.on.ca/about/pdf/Annual-Report-2004.pdf
Albemarle	350	http://www.k12albemarle.org/Board/Budget/SECTIONCOPEXP2.pdf
Cape Girardeu	371	http://www.cape.k12.mo.us/gibbar/technology_plan/Technology%20Plan%202003-2006.pdf
Coffee County School System	371	http://schoolcenter.coffee.k12.ga.us/education/dept/deptinfo.php?sectiondetailid=7094
Kent School District	392	http://www.vived.com/members/mit/docs/MIT_vivEDEval_20020328.pdf
Kingston City	400	http://www.kingstoncityschools.org/docs/0506budget/preso/business.pdf
Madison	400	http://preation.com/cgi-bin/sup/sup-track.pl?id=MSG3731&strict=on
Warren County Public Schools	400	http://www.wcps.k12.va.us/techplan.pdf
TSPR Kerrville Independent	433	http://www.window.state.tx.us/tspr/kerrville/ch11a.htm
Moreno Valley Unified	450	http://www.mvUSD.k12.ca.us/Departments/Info_Systems/MVUSD_05_08TechPlan_WebPost.pdf
LWC	465	http://web.lwc.edu/assessment/strat_plan_annual.htm
Snake River	488	http://www2.state.id.us/ope/Reports/rept0501.pdf

NEOSHO	550	http://neosho.k12.mo.us/tech_plan/TECHNOLOGY%20PLAN.htm
LVUESD	560	http://www.lvuesd.tehama.k12.ca.us/LVSDTechPlan2003.htm
District 8	600	http://www.district8.nbed.nb.ca/pages/decminutes/decSept1102.pdf
Needham	600	http://dmts.needham.k12.ma.us/tech_plan/tech-plan-03/executive_summary.html
San Benito	600	http://www.sanbenito.k12.tx.us/tech_plan/2001_2004/goal09.html
Visalia Unified	600	http://visalia.k12.ca.us/technology/tup/VUSD_TUP.doc
Wisconsin Rapids	600	http://www.wisinfo.com/dailytribune/wrdtlocal/282807935890898.shtml
Boise	601	http://www2.state.id.us/ope/Reports/rept0501.pdf
Cherokee	622	http://www.cherokee.k12.nc.us/tech_plan/revised2002plan.htm
NHUSD	650	http://www.nhusd.k12.ca.us/Technology/technews/NewsIt202.PDF
Meridian	670	http://www2.state.id.us/ope/Reports/rept0501.pdf
El Centro	700	http://www.ecsd.k12.ca.us/download/master_techplan03.pdf
Boundary	710	http://www2.state.id.us/ope/Reports/rept0501.pdf
North Forest	732	http://www.window.state.tx.us/tspr/northforest/ch09a.htm
TSPR North Forest Independent	732	http://www.window.state.tx.us/tspr/northforest/ch09a.htm
Afton	750	http://www.affton.k12.mo.us/technology/Resources/2003-06%20Technology%20Plan.pdf
Liberty Union High	750	http://www.libertyuhd.k12.ca.us/PDFFiles/LUHSDEETTTEchPlan.pdf
Tracy Unified	750	http://www.tracy.k12.ca.us/techdocs/TUSD%20Technology%20Plan%202002-2007.doc
WCPS	760	http://www.alt.wcboe.k12.md.us/mainfold/publicpage/newsreleases/121801cnews.htm
Guilford	830	http://www.guilford.k12.nc.us/fridaynotes_archive/6_14.htm
Frederick County	900	http://www.boarddocs.com/mabe/fcps/Board.nsf/0/bacf68627beb821285256e32004caa4e/\$FILE/FY%20'05%20Budget%20Request%20Summary%20%201-7%20revision.pdf
Gaston County	1000	http://www.gaston.k12.nc.us/district/techplan/techplan02.pdf
Shelby County Schools	1339	http://www.scs.k12.tn.us/technology/SCS_tech_plan/SCS_Tech_Plan.pdf
PVUSD	1700	http://epage.pvUSD.k12.az.us/infotech/activities/itreport.pdf