Dream Bigger
Alternate Title: Laptops in School – A Wonderfully Cautionary Tale

I unequivocally support the use of personal student laptops in education. The thoughts contained in this article are the result of reflections based on years worth of experience. Any criticisms are aimed at administrative missteps, unimaginative leadership and the reluctance of some schools to embrace change. The notion of kids with portable personal computers is an obvious development and as far as I am concerned, unassailable.

Ancient history
The first children I ever saw program a computer were in a third grade classroom next to mine. This wasn't a classroom I was teaching in, but rather the third grade class I attended in 1971. Children in Mrs. Petersen's third grade class spent a few weeks each year sharing their classroom with a timeshare teletype connected to a mainframe computer far out of sight. I later learned that the use of the computer had been an annual ritual in Mrs. Petersen's class for years before I discovered it.

I don't remember the site of this amazing machine exciting me too much, it was just part of someone else's classroom and besides, I thought Mrs. Petersen was scary. My teacher threw weekly parties complete with dance contests and prizes, the other kids only had a computer. No biggie.[1]

I don't think that I heard computers discussed, let alone saw one again until the mid-to-late seventies when my family and I paid a great sum of money to have a digital portrait made of us at Philadelphia's Franklin Institute. A Computer the size of Tasmania turned our family into a series of typewriter characters in a Stager version of the snoopy picture we were all forced to pound through in our middle school typing class' annual carpal tunnel festival.

In 1976 or 1977 I finally got to touch a computer for the first time. My junior high school (grades 6-8) had a mandatory computer-programming course for seventh and eighth graders. I only had the course once since I was in the band. Kids less prone to creative and intellectual pursuits got to take double the number of courses in those areas – ah school! More than a quarter century ago, the Wayne Township Public Schools in New Jersey thought it was important for all kids to have experience programming computers. There was never any discussion of preparation for computing careers, school-to-work, presentation graphics or computer literacy. Computer programming was viewed as a window onto a world of ideas given equal status as industrial arts, music appreciation, art and oral communications.

Mr. Jones, the computer programming teacher, was scary in a much more Dr. Frankenstein sort of way. Rumors abounded about him talking to his computer and kissing it goodnight before he went home at the end of the day. This guy could make computers do things! His class consisted of mini-tutorials, programming problems on worksheets to kill time while we waited to use the one or two teletypes sitting in the front

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[1] Then as now, high quality educational opportunities were all too dependent on random teacher assignment.

and back of the room. We could sign-up to do more programming or play a computer game afterschool. Text-based versions of boxing, tennis, football and Star Trek were favorites. Mr. Jones knew how the games worked and would show us the code if we were interested. Mr. Jones did sort of love his computer. Once I knew the odds for each football play the computer never beat me again. I could THINK LIKE THE COMPUTER! This made me feel powerful. The scarcity of computers made this activity highly social since we were often leaning over each other's shoulders to get in on the action.

A year later I entered high school where the band room and small computer room (still no mention of computer labs) were a sanctuary from the cruelty and torture of secondary education. Few classes actually used the three of four teletypes available in the computer room. Getting to school early earned you a chance to sign-up to use a terminal during lunch, afterschool or during a study hall. Now you could have personal access to a computer for up to 40 minutes per day. (It is unlikely that kids have that level of uninterrupted access in most American public schools nearly twenty-five years later.) The high school computer room was unsupervised and was adjacent to the math/science teacher's lounge. The proximity to adults working and socializing gave the computer room a sense of professionalism. The unguarded ditto machine sharing the room with the computers gave us a vehicle for publishing underground documents in the primitive era between Gutenberg and home photo-quality color printers.

The computer room was a place where a strong community of practice emerged. We learned from each other, challenged one another and played with each other's programs. We altered timeshare games, added ways to cheat and programmed cheap tricks designed to shock classmates. I remember when hitting a control-key would cause the computer to say, "Hello, Gary. How are you today?" One of the non-programmers nearly fainted when he thought that the computer knew me. I ran afterschool classes in BASIC for kids interested in learning to program. There were several levels of classes so I developed a placement exam as well. I was the President and Vice President of the Computer Club in successive years, probably a first in the recorded history of electoral democracy. Programming the computer was all consuming. I even got busted taking the bathroom pass from biology class and running down the hall to debug a program whose solution had come to me during the discussion of trilobites. This was but one of many humiliating high school experiences.

We never saw a manual for a piece of software although we treasured every issue of *Creative Computing* – working hard to meticulously enter hundreds of lines of computer code only to have every single program be buggy. Since we had little idea what was impossible, we thought anything was possible. We felt smart, powerful and creative. We took Fortran manuals out of the public library for no other reason than to hold a connection to a larger world of computing – a world we were inventing for ourselves.

During my first year of high school, ninth grade, I was invited to journey to a far corner of our high school to Dr. Petersen's office. This office was a secret to most of the school and like in the Wizard of Oz the Wizard was behind the curtain. In this case, the Wizard was the Hewlett Packard 2000C/2000F mainframe computer. Dr. Henry Petersen, the husband of Mrs. Petersen, was the district's math supervisor who in the early 1960s convinced the school district that computing was a serious intellectual pursuit to be engaged in by children. He paid for his folly by selling timeshare services to other skeptical school districts.

In his cluttered, air conditioned office/storage closet Dr. Petersen deputized us as systems operators. This meant that we were responsible for changing the magnetic tape each

morning, backing up the system's storage (I still don't understand octal code) and running the console. The console was a large foreboding teletype that looked like a prop from the Wild Wild West TV show. The console would give us complete control over the timeshare network. We could create accounts, delete users and perhaps even create mayhem. We never did.

Dr. Petersen's office gave us an even better place to hide from the pressures of high school and his secretary would take messages for us. Can you imaging anything cooler than being a ninth grader with a secretary? Since Dr. Petersen's office was off-limits to mere mortals, we could stay in it much later than the computer room that closed at 4PM. I remember many an evening when Dr. P said, have fun, see what you can learn, lock up when you're done.

Once, in 1977, I programmed a primitive chat system that allowed me and a kid in another school thirty miles away to exchange messages in real-time. I felt like Alexander Graham Bell. Another time I wrote a hack that told users that they did not login correctly so that they would re-enter their passwords. When they did so my program would capture them invisibly in a file. I don't remember why the file was invisible, but I know that the only way to decipher the password was to print the file onto papertape and then manually "read" the wholes on the tape. This tedious process was much more interesting than looking up the password in the notebook kept on our console.

This ingenious hack (I later read that a KGB spy was unsuccessful trying the same strategy in <u>The Cuckoo's Egg</u>) did get me into a bit of trouble. A 12th grader concerned more by competition than computer crime dragged me to Dr. Petersen to rat on me. After hearing about the horrible program I had written, Dr. Petersen said to the snitch, "at least HE'S thinking." That may have been one of the seminal moments in my life as a learner.

High school had one or two portable teletypes we could take home over weekends and connect to the school computer via an acoustic coupler that never seemed to work. In actuality, it was not much bigger than a laptop. It did however require being connected to a TV, although it had no graphics. This was my introduction to telecommunications, although I never thought of it as communicating. It was simply a way to use the school computer from home. In eleventh or twelfth grade the computer club got a TRS-80 Model 1 complete with tape drive and monitor. It too could be taken home on select weekends and I had it in my garage at least one entire summer. This allowed me my first real opportunity to spend dozens of hours programming and waiting for the programs on tape to load. The end of the school year required being picked up by station wagon since I often had the school's personal computer, vibraphone, electric piano, bongos and euphonium checked-out to me for the summer.

Computers were to be used to make things at my high school, not as a subject of study although I did earn a grade of D in a course entitled, "Algebra 2 with Computers." The computer part was cool. I still don't understand a thing about algebra 2. There was very little discussion about computing as a career because it was obvious that a kid with a D in algebra couldn't possibly study computer science. There was never a mention of computer literacy and owning a computer was unthinkable. The school computers were a place to lose ourselves in powerful ideas. I went off to study music at Berklee College of Music and gave no thought whatsoever to using a computer again until at age 18 1/2 I was hired by a well-established day camp to create one of the nation's first computer camp programs for children. Before I was old enough to buy liquor, I had my own staff, budget and was running a computer center for kids. I never realized this before, but nineteen years ago Deerkill Day Camp in Suffern, New York was my very own dot.com startup. I was hired for my expertise and energy, rather than my résumé.

My slightly older peers, Bill Gates and Steve Wozniak were involved in similar little ventures at the time. In fact, many of the computing visionaries who changed the world had similar early experiences with computers. I remember the explosion of thinking and creativity I experienced and try to recreate the spirit of that computer-rich learning culture in every school I visit.

I won't bore you with the details of my tenure running a computing program out of a camp-owned horse trailer adjacent to the 6-inch deep boating pond and really mean goat except to say that the kids in my care always used computers to make things and write their own programs. Boys and girls participated equally and fell in love with the magic of computing.

Laptops
I spent the rest of the 1980s leading teacher professional development workshops, evangelizing Logo (which I discovered around the time of my camp job) and began presenting at conferences. In 1990, a paper I authored was accepted by the World Conference on Computers in Education in Sydney, Australia. I had dreamed of traveling to Australia since I read Let's Go to Australia at the age of eight. This was my chance.

Upon arrival in Sydney I met daring Australian educators like Bruce Dixon, David Loader and Steve Costa. They're faith in the power of children and personal computing would forever change the world. There were kids from the Coombabah State School in Queensland and Methodist Ladies' College (MLC) in Melbourne carrying around laptop computers and programming in LogoWriter. One of the kids collaborated with me to build a LEGO Logo fax machine. I had not witnessed such intellectual playfulness since high school and I knew I had to be a part of it.

MLC and the Queensland Government stunned me when I was invited to come back to Australia and be professional development activities and provide consulting services to the worlds first two laptop schools. I have since returned 15 times and have worked in "laptop schools" across Australia for the past decade. Only recently have American schools discovered the use of laptops in education. For years, most of the papers about laptops and kids I submitted for American conference programs were rejected as works of fiction.

From 1989 through the mid-1990s, Methodist Ladies' College under the leadership of David Loader was the scene of an unprecedented learning renaissance. Dozens of talented educators were engaged in rethinking what it means to be a teacher and learner in a world of ubiquitous personal computing. David Loader and many of his colleagues not only noticed that computers were getting smaller, cheaper and more powerful, but staked their reputations on the successful reinvention of school for the information age. [2]

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[2] The Australian Government should consider erecting a monument in honor of Stephen Costa. Archaeologists believe that Mr. Costa was the first teacher (of the modern era) to teach an entire class of children armed with personal laptop computers. Over the past eleven years, Steve Costa has taught children and their teachers to think, create and express themselves with laptops and open-ended software environments like MicroWorlds. He has kept his eye on the prize longer than most educators and remains unimpressed by the latest dumbed-down wares being pedaled by the educational software industry. There are no opportunities to testify before Parliamentary committees or oversea junkets for Steve, just the satisfaction of knowing that he is making a difference in the lives of his kids. Hundreds of educators have been inspired to reinvent their own teaching practices after a brief visit to Mr. Costa's classroom. Like too many educators, Steve's contributions and extraordinary talents may be underappreciated by his employers. I am grateful for his friendship and salute the role he plays in the history of education.

What took place at MLC was never an experiment or a pilot project. The endeavor was the work of one school using its own funds and making its own decisions. Major computer corporations played no role in the process. The school never intended to create a model since educational models seem to die when shrinkwrapped for easy reproduction. The most successful laptop schools embraced an emergent process of learning along with and from the children.

The impetus behind the laptop investment at MLC was David Loader's sense that school was becoming increasingly irrelevant in the lives of kids. An early essay by David, called "The Audacity of Sunrise," (the name used to identify the first year or two of laptop use) used very strong rhetoric to communicate his displeasure with the current nature of schooling. David wrote, *"Apparently the sun cannot rise in present schools,"* and went on to quote John Holt.

Almost every child, on the first day he sets foot in a school building, is smarter, more curious, less afraid of what he doesn't know, better at finding and figuring things out, more confident, resourceful, persistent and independent, than he will ever be again in his schooling

The inspiration for the first generation of laptop schools came from Dewey, Piaget, Papert, Holt, A.S. Neil and Postman. It was not until years later that the remarkable entrepreneurial leadership and innovation of classroom teachers and school administrators inspired leaders of the computing industry, including Bill Gates.

Loader's ideas were not without precedent. Other before and since have supported the notion of personal computing for kids.

Cynthia Solomon and Seymour Papert wrote the following in 1971…

"...Only inertia and prejudice, not economics or lack of good educational ideas stand in the way of providing every child in the world with the kinds of experience of which we have tried to give you some glimpses. If every child were to be given access to a computer, computers would be cheap enough for every child to be given access to a computer."

Conservative former Speaker of the United States House of Representatives, Newt Gingrich told *Wired* Magazine the following in 1995…

"I believe that every American child ought to be living in the 21st century... This is why I like laptops - you can take them home. I'm not very impressed with computers that schools have chained to desks. I'm very impressed when kids have their own computers because they are liberated from a failed bureaucracy ...

You can't do any single thing and solve the problem. You have to change the incentives; you've got to restructure the interface between human beings. If you start redesigning a learning system rather than an educational bureaucracy, if you have incentives for kids to learn, and if you have 24-hour-a-day, 7-day a week free standing opportunities for learning, you're going to make a bigger breakthrough than the current bureaucracy. The current bureaucracy is a dying institution. "

When a cross-section of leaders including Seymour Papert and Newt Gingrich line up on the same side of this issue it is difficult to imagine the other side. School investment in laptop computers was clearly on the right side of history.

Three kinds of laptop schools
It appears that schools considering the implementation of laptops can be placed in three categories. All three categories are based on motivation and leadership. Schools without visionary leadership, coherent plans, patience and a dedication to improving educational opportunity for all learners will be less successful.

When an institution can only afford a progressive roll-out of computers, it is critical that entire units are implemented at a time. In other words, ensure that an entire class, grade level, school or district is deployed with laptops. Professional development and support for learning are difficult when some kids or teachers do not have laptops. I'm familiar with at least one school who gives ninth graders laptops and then collects them at the end of the school year. I can't imagine disempowering students after they become dependent on learning with laptops. Resentment and problems of educational equity will be problematic who don't heed this advice.

There are three types of laptop schools:
1. The pioneers
   These schools, like MLC, are committed to personal computing as a catalyst for transforming the learning process and mission of school. Such schools provide support sufficient to sustain the change process.

2. The marketeers
   These are schools concerned primarily with the marketing value and publicity associated with laptops and kids. It never ceases to amaze me how easy it is to get a photo of a school principal and two kids at a computer published by the local newspaper twenty years after microcomputers began appearing in schools.

3. Their neighbors
   It makes little difference whether the school up the street got laptops; you will soon be forced to due to market pressures.

A recent consequence of the marketeers and neighbors is that it has become possible to differentiate one school from another by announcing that a school has decided not to "go with" or to abandon laptops in a self-serving act of defiance. The press loves these stories since they retell the timeless and much-loved tale of failing schools. An interviewer on Australian radio asked me to respond to a recent article noting that some schools were "abandoning laptops and going to the web."

I told the listeners that these schools possess a terrific ignorance of both technologies. While it is valuable to use the web to access information, the real learning power of computing is in the act of constructing something. Somewhere along the way the learner needs access to a computer and constructionist software environments in order for this to be possible. In other words, the person who learns the most from educational software is the one who made it. If the goal is to maximize learning opportunities, then kids should be computers for making things, collaborating with others and contributing to the body of knowledge – not passively surfing the web.

Myths rejected
The early laptop schools embraced constructionism, learners constructing meaning in a community of practice, while rejecting several wives tales about classroom computing. Many schools make the mistake of believing that kids should not have access to computing resources until their teachers know what to do with the computers. This idea is patently ridiculous since kids are already computer fluent and could be used as a learning resource for everyone in the school. Twenty years after microcomputers began entering schools we are still cajoling, coercing, bribing, threatening, begging teachers to use professional tools used widely throughout society. Unless we wish to insult educators by continuing to insinuate that they are dumber than the rest of the culture, we should determine why they have been slow to use computers in their professional practice.[3]

Besides the insane external demands imposed on teachers in the name of higher tougher meaner standards and the energy required to jump through pedagogical hoops, I believe that scarcity is a major obstacle to use. Computing has failed to make a dramatic impact on classroom practice not because there are too many computers, but because there are way to few to do anything interesting. How many after-school workshops should a teacher be expected to attend before they actually have access to the computer resources we say they should be using?

Many apologists for inaction within the educational computing community offer a strategy that between 30 and 50 percent of technology funds should be spent on professional development. This is a cheap accounting trick. We don't pay for art teachers out of the crayon budget nor should we pay for teacher development out of the budget earmarked for computers – especially since the professionals will not develop without adequate access to computers. 100 percent of the technology budget should be spent on technology while the professional development budget should address the educational concerns of a school as computers are used to serve those more fundamental objectives.

Never underestimate the power of gesture. From Sydney to Harlem, the sheer act of entrusting a young person with a laptop computer communicates to that person that you value her as a valuable member of society and welcome her to the world of serious intellectual pursuits. Students have risen to the occasion in nearly every instance. Time and time again we have seen that providing teachers with laptops enhances their stature as professionals and helps them see themselves as participants in the creation of a new age.

Higher standards, humanistic goals
Some of the early laptop schools assumed the stance that since computers were being deployed to benefit kids and teachers are employed to benefit kids, professional development activities should be geared towards helping teachers use computers to benefit kids. These schools were also committed to the proposition that all children can engage in sophisticated intellectual pursuits such as computer programming. Students using Logo environments such as LogoWriter and MicroWorlds created brilliant naturally interdisciplinary projects that inspired teachers to rethink the nature of teaching, learning, curriculum and assessment. The laptop helps realize Logo's promise of providing learners with a rich environment free of adult limitations on exploration, investigation and expression. The fact that the students have the laptop with them at all times allows them to engage deeply in the creation and debugging of sophisticated highly personal projects. While laptop-based school assignments are impressive it is the

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[3]Read my series of articles, "Taking Back the Net," at http://www.stager.org/articles for more examples of how we undermine teachers attempting to increase learning opportunities for their students

extraordinary projects created by students on their own time that reminds us of the wisdom behind the investment in laptops.

The guiding principle that students should program the computer rather than the computer programming the student rejected the computer-assisted follies of behaviorists as well as the computer literacy movement of the early 1990s. Computer literacy curricula is required when the need to justify computer purchases meets limited access to those resources. Schools respond by developing mechanisms for exposing a large number of students to too few computers. Laundry lists of isolated computer skills can be taught and tested when there are not enough computers to use in substantive ways.

The educational computing community – the folks who get degrees in educational computing, who publish papers and speak at conferences - have done little to advance the substantive educational reforms made possible by ubiquitous access to computer and network technologies. There are few examples of laptop learning promoted by the educational computing community and as far as I'm concerned, no models to rival large-scale laptop implementation. It is as if the international music education community got together and advocated that all students should play the kazoo. The kazoo is the perfect instrument of the status quo. Kazoos are cheap. They're easy to play (leading to high test scores). No teacher development or curriculum reform is required. You can just add a few minutes of kazoo playing onto the school day. No pedagogical practice is challenged and best of all schooling will remain precisely as it is today. The only problem is that kids will hate playing the kazoo, nobody wants to listen to kazoo ensembles and schools will not become more receptive to the changing needs of society as a result of universal kazoo literacy programs.

In his terrific book, The Pattern on the Stone: The Simple Ideas that Make Computers Work, computer science pioneer, Daniel Hillis, speaks of the magic of computing. Educators whose work is inspired by Hillis' vision will witness an explosion of student creativity. Such educators will be receptive to future advances in computational technology since their focus is on possibility rather than features.

The philosopher Gregory Bateson once defined information as "the difference that makes a difference."... A lot of things are different in the world today, but the difference that has made the difference has been computers.

These days, computers are popularly thought of as multimedia devices, capable of incorporating and combining all previous forms of media - text, graphics, moving pictures, sound. I think this point of view leads to an underestimation of the computer's potential. It is certainly true that a computer can incorporate and manipulate all other media, but the true power of the computer is that it is capable of manipulating not just the expression of ideas but also the ideas themselves. The amazing thing to me is not that a computer can hold the contents of all the books in a library but that it can notice relationships between the concepts described in the books - not that it can display a picture of a bird in flight or a galaxy spinning but that it can imagine and predict the consequences of the physical laws that create these wonders. The computer is not just an advanced calculator or camera or paintbrush; rather, it is a device that accelerates and extends our processes of thought. It is an imagination machine, which starts with the ideas we put into it and takes them farther than we ever could have taken them on our own." (Daniel Hillis, 1998)

Technological fluency should be the goal rather than mere literacy. Kids using laptops and Logo demonstrate an enthusiasm for learning and habits of mind that will serve them for years to come. The shallow thinking responsible for focusing computer use on office

applications may transform kids around the world into fabulous ten year-old secretaries, but these skills are unnecessary, quickly attainable or obsolete before they may ever be used. Many computer literacy efforts offer solutions in search of a problem.

Most computer users utilize a small subset of software features, but schools seem to focus on tool mastery rather than on using the computer in a deeper fashion. This focus on isolated computing skills perpetuates the myth that computers are hard, worth of study and out-of-reach for some learners. It is disappointing that more than a decade since laptops were first embraced as an antidote to computer literacy instruction we find so many educators and vendors concerned with presenting artificial curriculum integration gimmicks as justification for using computers in the classroom. Given the choice between focusing on the computer as a productivity tool and using the computer as a universal material for learning, schools should always focus on the learner, not the computer. While productivity tools are critical they should remain transparent.

Kids need better computers than most adults. Few adults need to control robots, create animations, build models of complex phenomena, compose music or edit video while away from the office. Learners the ability to perform these and other tasks anytime, anyplace. The recent availability of smaller crippled thin-client computing devices have appealed to educators more concerned with cost and control than on student learning. A thin-client is fine when you have a powerful full computer to attach it to when you get back to the office, but this is not the case in schools. Investing in thin-clients may save a school a bit of money, but is a detour on the road to the powerful learning possible with laptops. The reduction in computer prices and laptop size makes it less advantageous to purchase thin clients.

Net distraction
Not only can the Internet, a revolutionary force in learning and every other aspect of society, distract educators and shift the focus back away from construction of knowledge to a more traditional broadcast model of instruction rejected by the pioneering laptop schools. The hype and publicity surrounding the Internet explosion may distract schools from their commitment to constructionism.

It need not be that way. The Internet offers unprecedented opportunities for communication, construction and collaboration. The true power of the net is in its ability to democratize publishing. Kids can now share their writing, art, computer programs, radio shows and television broadcasts with a nearly infinite world-wide audience. The World Wide Web is the natural extension of kids' Logo programming by providing a publishing vehicle for their interactive content.

In many schools, Internet fever has caused the administration to employ network personnel with no educational experience and too often little professional expertise in computer networking. This personnel expansion ameliorates some of the benefits of laptop computing by taking the responsibility for computing away from the individual teacher and learner. Administrators who may not play a major role in the implementation of the school laptops may unentionally place important curriculum, teaching and learning decisions in the hands of their least-qualified personnel.

It is worth remembering that network personnel work for students and teachers, not against them. Information wants to be open and free. The more schools spend on security the less useful the computers will be and the more it will cost to maintain them. It is ironic that laptops were supposed to reduce technological overhead and yet legions of network administrators, technology coordinators seem to be employed to run up costs and reduce the freedom to learn. The more schools employ non-instructional computing

personnel, the more likely it is that the focus will shift towards technology and away from learning.

Great stuff
The laptops learning stories found here in this volume and in other publications share the excitement of educators involved in laptop schools. Research studies conducted by doctoral students and Saul Rockman offer validation for the anecdotal testimony of terrific teachers. We have watched teachers transform themselves from civil students to scholars, observed unsuccessful students who become the star of their classrooms and math teachers who learn just enough French to be able to compliment student work within their bilingual Logo projects. Kids have embraced their laptops and their power as learners. We've seen legions of kids do amazing work on their laptops – Mozart-playing algebraic equation solvers; interactive animated reports illustrating countless curricular concepts; homemade video games; programmed robots; streaming web-based radio stations; multimedia productions; MIDI-based musical compositions; science experiments controlled by probes attached to laptops; dynamic poetry; student build science simulations; plays written and blocked; desktop published documents and much more.

Teachers who once had a cavalier attitude towards class size became outspoken advocates for smaller classes after making the transition from thirty plus students working on the same narrow assignment to a classroom pulsating with the energy of dozens of different open-ended projects. Seventh grade teachers at Methodist Ladies' College became so inspired by the English-speaking girls learning mathematics by constructing new knowledge in French LogoWriter and spontaneously speaking French to one another while doing so that they volunteered to teach an entire cohort of students ever subject in French. The laptop is indeed an imagination machine which starts with the ideas we put into it and takes them farther than we ever could have taken them on our own

A call to leadership
While I don't wish to sound cynical, I remember the words of my old trumpet teacher who used to say, "never satisfied only gratified." Despite the amazing examples of educational potential presented by laptop students and the substantial investment of laptop schools, there are few examples of genuine sustainable school reform accompanying the "laptop lighthouses" illuminating the way.

Despite the desires of teachers, the needs of children and the enthusiasm of parents I am unaware of one laptop school that built upon its success to realize the educational reforms described by Dewey, Papert and other progressive educators. The overwhelmingly positive reaction to laptop implementation provides many schools with a historic mandate to make the systemic reforms needed to create new school structures, humanize schooling and challenge our notions of curriculum, teaching and assessment. While some schools have embraced block scheduling in order to support project-based learning, I have little knowledge of laptop schools who have taken the next obvious step of reinventing education for the twenty-first century. In my opinion the next decades' laptop schools will be judged by how many have multi-aged classrooms, have adopted truly authentic forms of assessment, build curriculum upon the interests of each learner and stop ranking/tracking students.

School leaders must familiarize themselves with the technology, assume responsibility for decisions and model the types of learning they advocate for their teachers and students. In other words, it is critical that school administrators engage in the change process accompanying laptop implementation. Few school principals actually participate

in the hands-on professional development activities they prescribe for their teachers. In the words of Silicon Valley, principals must begin to eat their own dog food. Most importantly, school administrators must possess the attention span, vision and leadership skills necessary for supporting teachers through their own growth processes while building structures to ensure long-term educational innovation.

The ongoing attention accorded to the laptop part of "laptop schools" may actually retard our practice. Too many educational leaders have become distracted by the technology and have strayed from their mission in order to engage in interminable discussions of ethernet dongles and laptop prices. The technocentric focus on laptop procurement, software upgrades and competitive pressure to be doing something new only serves to reinforce the notion that laptops are a school novelty.

As I write this, the Independent Governor of Maine, Angus King, seeks legislative approval for a plan that would use interest generated by a surplus created trust fund to provide every seventh grader in Maine with a laptop computer. The Governor sees this as an imperative investment in the intellectual, cultural and economic future of his state. However, his political opponents and more importantly, the citizens of Maine, are skeptical about investing in an untested scheme. More than two thirds of the voters polled are opposed to the Governor's laptop proposal. The newspapers are full of editorials challenging the wisdom of the proposal by questioning the merits of anytime, anywhere learning and the viability of trusting seventh graders with laptops. One class of eighth graders wrote letters to the editor of the Portland Press Herald proclaiming how they are too irresponsible to be trusted with a laptop. Could this be a more alarming symptom of a school system in crisis?

In this information age you might be asking yourself, "How can the citizens of Maine not know that Steve Costa began teaching with laptops eleven years ago? Why don't they know that fifth graders in Harlem walk to and from school each day with a personal laptop without horrific examples of theft, breakage or violence? Why do they think that the idea of students without laptops is untested?" I would like to go out on a limb and suggest that the shortage of schools dramatically transformed by years of laptop use has created a vacuum in which we continue to focus on the novelty of laptops and the value of educational computing.

It seems as if the ideals of progressive education and the instruments of that progress, in this case the laptop, are treated with the caution and suspicion worthy of new devices. Multi-age education, authentic assessment and social collaborative learning environments outfitted with object to think with are not new inventions. They represent the timeless natural form of learning. New age prophets like Don Tapscott is mistaken when he says that, "new forms of learning must replace forms of learning." A more accurate statement would be, that new forms of teaching must replace old models of teaching. The forms of learning needed today have always existed if not always honored by the structure of the common school.

So why should every kid have a laptop? Seymour Papert would respond by saying, "because I have a laptop and so does almost every person I know engaged in any sort of creative or knowledge work." We should want kids engaged in serious intellectual and creative pursuits. The laptop enables this. Critics might also ask, "why should schools provide laptops when computers and Internet access are already ubiquitous in the home?" The answer is that all kids do not yet have equitable access, but even when the access issue is resolved in the near future there is a reason for schools to provide laptops. It is human nature to value what you pay for. Schools that invest in laptops for every child and teacher send the message that computers are critical learning materials and here to

stay. This is in some ways an incremental step pointing towards the day when every member of society has an indispensable portable computer.

This acknowledgement inspires schools to reinvent themselves and be prepared for the day when every kid has a computer with them when they arrive at school. "Non-laptop" schools will react in haste, hysteria and ignorance when kids arrive at school with their own personal computers. This will only cause greater student disaffection and accelerate the irrelevance of school in the learning life of children.

In the past most people left the world only slightly different from how it was when they found it. The rapid and accelerating change that marks our times means that every individual will see bigger changes every few years than previous generations saw in a lifetime. So this is the choice we must make for ourselves, for our children, for our countries and for our planet: acquire the skills needed to participate with the construction of what is new OR be resigned to a life of dependency. (Seymour Papert - What is Logo? And Who Needs It? - 1999)

That is our challenge. As prices fall and computer power increases in smaller packages, the term, "laptop school," will seem quaint and elitist. We may also take computers for granted and not use ubiquitous access as an opportunity to invite students to use them in the creation of something great. It is the responsibility of professional educators to help close the imagination gap and empower students to go beyond what has been previously possible. It is our challenge to dream big dreams, create a rich learning environment for the social construction of knowledge and be open to new opportunities. I Look forward to the day when all students experience the sense of wonder and accomplishment I enjoyed while using my school's primitive computers. I salute your efforts and wish you well in enact this vision of educational computing as a universal right for all learners rather than the nostalgic rambling of an old-timer.

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