Girls and Technology – Overcoming Myths and Malpractice[1]

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Girls and Technology Conference

Pepperdine University

It is indeed an honor to speak at this conference and share my experiences and expectations with such an august audience. My qualifications for this conference could be based on my two decades of work with technology and kids, the work I did in the early days of school laptop computing right here in Australia or the fact that I am the parent of two teenage girls. I originally suggested that this talk be titled, "I'm not sure why Dale Spender hates me," based on my experience as Ms. Spender's human piñata at an MLC dinner and the ironic fact that she went on to quote me extensively in one of her books.

The theme of this conference, girls and technology, implies a problem. Neither girls nor technology are the problem. If a problem does exist, it is with the men and women commonly identified as educators and to a lesser extent, parents. It is the intellectual timidity, professional indolence, imagination gap and what Seymour Papert calls, idea aversion that prevents us from meeting the needs of all digital age children. The greatest number of victims of such idea aversion may be girls since for reasons real and imagined. The prevailing myths that girls don't like computers; girls need different technology; girls should learn to criticize technology; girls have adequate access and ample role models; school leaders are qualified to make technological decisions; and schools should be used as social sieves lead to the creation of pedagogical decisions ultimately detrimental to girls themselves.

Microcomputers and the global information infrastructure offer unprecedented opportunities for expanding the learning community and for children to engage with powerful ideas. The choice is between an increasingly irrelevant system of schooling or the realization of John Dewey's dream for a learning environment in which children can achieve their full creative and intellectual potential. Computational and communication technology may be used as an intellectual laboratory and vehicle for self-expression or as a tool for oppression. The first option makes schools better places for teachers and kids to learn, the second will hasten the demise of school's monopoly on education.

It would be a shame if we missed the chance to revolutionize the learning environment if we were simply ignorant. It would be a sin to ignore the remarkable possibilities demonstrated right under our noses in order to preserve some quaint notion of 19th century education. We know how the combination of elevated expectations, respect for epistemological pluralism, a dash of creativity and ubiquitous can produce a learning renaissance because we've seen it in schools a tram-ride away.

The most important educational technology innovation in the past two decades began at Methodist Ladies' College in 1989 when David Loader, a giant in girls' education, committed his

school to the proposition that every child should own a personal laptop computer. This was never intended as a stunt, experiment or project. David noticed that computers were getting more portable and affordable while anticipating that such a bold investment would pay great dividends for educators concerned with making schools what James Britton would describe as, "more hospitable to the intentions of children."

Six years before the World Wide Web, Loader shared these provocative thoughts with his school community.

Apparently the sun cannot rise in present schools…

Unlike David Suzuki who dismisses computers as information processors, we see knowledge not so much as being processed but as being constructed in the classroom. John Dewey's observation that the content of the lesson is the less important thing about learning, is relevant (here). - David Loader

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 - John Holt

This was the shot heard 'round the world. Soon after laptops were delivered to MLC, impressive student LogoWriter projects inspired teachers to rethink their notions of curriculum, assessment, scheduling and most importantly, the under-appreciated learning abilities of their students. Humanities teachers demanded long uninterrupted blocks of time to accomplish interdisciplinary collaborative projects. French teachers ventured into the uncharted waters of maths classrooms, boatloads of educators from around the world visited Kew and the idea of Marshmead was born.

Steve Costa, was patient zero – the first teacher in history to teach a class of girls each equipped with a laptop. Steve's extraordinary teaching abilities coupled and willingness to share his talents with colleagues has made his classroom one of the most visited in the world. Not only did Steve Costa possess the confidence and courage to invent the future, he has demonstrated a remarkable focus over the past thirteen years. He has not been seduced by the latest technological fad or gimmick, but has continued to help students maximize the potential of their minds and computers by remaining committed to the hard fun of programming in Logo (MicroWorlds). Steve's work continues to inspire me. What he and his girls have accomplished is remarkable. If there were any justice, Mr. Costa would appear on an Australian postage stamp. He is arguably one of the most important teachers in this nation's history.

I am delighted that Steve Costa and David Loader will keynote a conference in Maine, USA this August between Alan Kay, the inventor of the personal computer, and Seymour Papert, the educator who predicted thirty-five years ago that every child would have a personal computer. Maine has built upon the foundation laid by these educational giants by passing a law requiring the provision of an iBook computer and 24/7 net access for every seventh and eighth grade

student in the state.

This however is not an all-male history lesson. Many female teachers at MLC and Coombabah State Primary School in Queensland helped the world rethink the role of computers in schools. Merle Atherton, a quiet humanities teacher two years from retirement, embraced Logo and laptops with enormous enthusiasm and inspired countless colleagues to enjoy thinking about thinking. She was given an "in-school sabbatical" so she could work in classrooms alongside her colleagues.

Joan Taylor's world-class Community Education department played an enormous role in the organization of holiday computer camps, global conferences and professional opportunities for teaching staff. The holiday computer camps provided parents with a creative child-care service and benefited the school in two important ways. The first benefit of the camp was as a "strongly suggested" prerequisite to attending the school as a new student. Four days of project-based computer use, the arts and a bit of sport provided adequate preparation for new children to succeed when they joined existing classrooms. Another benefit of the camps was that members of the teaching staff served as counselors. More "expert" teachers would lead robotics or Logo classes and less experienced teachers would apprentice. The casual nature of the camp allowed teachers to gain new knowledge and develop increased levels of consequence. Apprentices often replaced the experts in subsequent camps.

Community education also provided a venue for teachers interested in learning basic computing skills or finding out how to use computers for administrative tasks. This way the school could dedicate its professional development resources to using computers in ways that reformed education and benefited kids.

Merle and Joan are unsung heroes in the history of school computing.

I remember bringing some student projects back to the USA from MLC. When I shared them with one of America's most accomplished computing-using teachers he remarked, "Oh, that's what it looks like when the kids have time." The ability to learn and work anywhere anytime is an obvious, yet important rationale for laptop use.

MLC was a magical place during the early nineties. Every aspect of schooling was open for discussion and reconsideration. I spent as long as three months at a time at the school with a brief to do anything I thought would contribute to educational excellence. I worked with teachers and kids in classrooms, consulted with staff, created the holiday computer camps, built a LogoExpress system to facilitate telecommunications from home and within school and had constant access to the principal. When I expressed concern over the gap between classroom reality and the rhetoric proclaiming the school's commitment to constructionism, the principal supported my desire to take dozens of teachers away for intensive residential professional development sessions, fondly remembered as pyjama parties. After all, constructionism is something you DO as well as believe. You cannot be a constructionist who subcontracts the construction. "Do as I say, not as I do," will no longer cut it.

Not all was perfect, even during these halcyon days. I remember needing a small bit of electronic tinkering done while at MLC and saying, “I’ll just get a girl to solder this for me.” My colleagues looked nervously around the room before someone said, “our girls don’t solder.” Concern for gender equity apparently ended at the point where students use tools, learn about electronics or perform actual service to the school community. The school musical theatre production hired professional musicians to provide accompaniment rather than utilizing talented student musicians. Ted Sizer, Deborah Meier and others write elegantly about the benefits of students assuming more responsibility for sustaining the intellectual culture and accepting responsibility for the operation of their school. We need to work harder

Soon after the pioneering efforts of MLC, two other groups of laptop schools emerged. The “marketeers” were schools more concerned with the marketing and publicity benefits of “doing laptops” than with reforming schools while nearly every other school found laptops in its future by inertia. The “marketers” and their “neighbours “ lacked the vision of the pioneer schools and found that they could differentiate themselves by embracing less empowering uses of computers and cynical assessment schemes like the International Baccalaureate. Some principals became more concerned with schmoozing hardware vendors and rising software version numbers than with educational innovation.

I am most disappointed at how little impact the laptop volcano has had on the structure of schooling. I assumed ten years ago that any educator with common sense would recognize the need for new school environments incorporating multiage, learner-centred, interdisciplinary learning. The creation of fantastic alternative learning environments at Marshmead and Clunes are evidence of a failure to bring about substantive school reform in traditional schools. The need for a school to build a new campus in order to be more learner-friendly suggests the institution’s incapacity for self-correction.

Perhaps I was naïve, but in the early nineties I had the following expectations for today’s schools.

The easy stuff	**The hard stuff**
Schools would feature: • Basic productivity tool fluency • Electronic publishing of student work • Electronically-mediated parent/teacher communication • Teachers using the computer for personal productivity/school paperwork • Every child and teacher would have a personal computer	Kids would be: • All laptop owners • Composing music • Writing powerful computer programs • Freely communicating online • Building robots • Conducting scientific investigations with probeware

• We would stop referring to computers as technology • I.T. would cease to exist as a school subject	• Publishing in a variety of convergent media

The hard stuff	**The really hard stuff**	**The really really hard stuff**
School leaders would be: • Using computers in personally powerful ways • Supporting the imaginative use of emerging technology • Participating in the professional development they impose on teachers • No longer using computers to quiz or test students	• Principals would no longer be able to get their photo in the newspaper just for standing next to a kid and a computer • School would be learner-centered and educators would be able to articulate what that means • School leaders would spend less time making computer deals and more time collaborating with other learners • Students would be able to program and construct their own software tools • The supremacy of curriculum would be abandoned & no one would speak of delivery • School leaders would join the community of practice • Kids would collaborate with other kids and experts around the world	• Multi-age interdisciplinary "classrooms" would be widespread • External forms of assessment would be replaced by more effective humane forms of authentic assessment • Kids would spend less time in school • Schools would stop viewing the needs of children as an impediment to the enterprise • There would be far fewer technology coordinators in schools

The advent of the World Wide Web in the mid-nineties allowed schools never particularly committed to constructionism to embrace a vehicle for reinforcing the primacy of curriculum and instruction. Despite the unrivaled power of the net to democratize publishing and offer unprecedented opportunities for collaboration, it has been assimilated by schools in the name of curriculum delivery and the status quo. Throw in the incredible expense of networking and the disasters caused by the unprecedented authority given to the non-educators running school technology infrastructures and the results were bound to be disappointing. It seems to many that the golden days of Australian school computing may be sadly behind us.

I invented Murray's Law to describe the current state of school computing. Murray's Law combine's Moore's Law and Murphy's Law to state that every 18 months schools will purchase computers with twice the processor power of today and do things twice as trivial with those computers. Things need not be, as they seem. I will share glimpses of the opportunities some of your schools may be missing during this presentation.

MLC was clearly on the right side of history. Rather than give long-winded educational rationales for portable computers I suggest that the reason your school should provide laptops is because it's training wheels for the adults in the school. It is inevitable that every kid will have her own full-featured portable computer, although it may not look like a laptop. Embracing laptops gives your teachers a few years to prepare for that eventuality on their terms.

I am not a cyber-utopian. I want children to have the widest possible range of high-quality experiences regardless of the medium. However, computers do offer new things to know and new ways to know new things. They can be intellectual prosthetic devices that enable people to learn and express themselves in unprecedented ways. For at-risk students the computer may provide the first opportunity to experience the satisfaction of having a wonderful idea.

For girls' schools, the computer offers rare opportunities for young women to invent their futures. Such schools will be successful only when they embrace constructionism, computers and put the needs of learners ahead of those held by curriculum designers. The women charged with the education of girls need to model the most fearless, creative and intellectually-rich use of computers if they are to inspire girls to be their very best.

Myths We Need to Overcome

#1 Girls Don't Like Computers

Girls use computers in all sorts of ways ignored by schools. They use the technology to sustain and establish relationships via instant messaging, a technology needlessly prohibited by many schools. They publish web pages about bands and television shows they love. They share music and rip MP3s. Girls even play video games when those games are more playful and less violent.

We need to look for opportunities to build software environments and computer activities that engage girls. Many more peer-to-peer products need to be developed.

#2 Children Use Computers in School
Some of your schools have gone to great expense in order to produce glossy brochures exclaiming, "We have computers!" What may been news in 1979 is no longer newsworthy. That race has been won. What do your girls DO with those computers?

It is not your job to sort children, to decide which ones will have certain opportunities. It is your job to ensure that all children are exposed to the widest possible range of possibilities within a supportive caring environment.

Unless every girl has the opportunity to explore robotics, programming, MIDI composition, digital filmmaking, multimedia web publishing in a culture that values these activities, we cheat them of a thorough and efficient education. While computers *should* be transparent across all disciplines, it is outrageous how few comprehensive secondary schools offer computer science as a serious course of study. Few girls even know that this is an option as avocation or vocation. IT or ICT classes are just dressed-up computer literacy and outdated business studies courses. They lack rigor and don't reflect the state of computing.

According to a recent study conducted by the Australian government, 44% of all children spend less than 40 minutes per week and 66% of all children spend less than one hour per week using a computer in school.[2] Similar levels of inadequate access would be found in the USA as well. The major implication of this limited access is that many girls will just not use computers at all. Scarcity is a major obstacle to use. It is just not worth it for a girl to fight for an extra few minutes of computer time. 1:1 laptop computing certainly helps overcome this problem.

#3 Girls Need Different Technology
The myth that girls that girls need "pink" technology is unfounded. They need more imaginative examples of how computers and related technology might be used. Girls don't dislike LEGO robotics and programming. It is just that their mothers and grandmothers do not buy LEGO for them. Their mothers don't buy much software either.

Girls don't need purple bricks. They do need project ideas that don't result in trucks. Time and time again we have seen that girls are quite imaginative competent programmers and engineers when inspired to engage in such activities.

Girls play computer games in ways that attempt to push the boundaries of the rules – to manipulate them. Boys study the rules and try using them to get ahead, to vanquish opponents. I have seen many young girls "play" with the genre of *Expanded Books* by clicking on words in silly sequences in order to get the computer to say funny things. Their willingness and desire to manipulate systems should make girls the best computer users, not the most at-risk.

Since it is increasingly difficult for companies to earn a profit producing software for children, even less is created for girls. That which is created for girls insults their intelligence and merely pretties up either trivial tasks like coloring or is related to petty chores like storing addresses or

diary entries.

There have been a few notable attempts to produce software for girls, but these efforts have borne little fruit. In the late 1980s, SEGA assembled all of their female engineers, artists, authors, programmers and game designers in one building in the hopes that all of this "girl power" would inspire the creation of hit videogame software for girls. It did not.

Brenda Laurel's company, Purple Moon, was dedicated to producing software for girls and spent unprecedented funds on research into gender play patterns. The problem was that by the end of the research there was no money left to make quality software that offered compelling experiences for girls. I remember my daughter calling Purple Moon technical support to complain that her interactive adventure game crashed. She was informed that it didn't crash, it just didn't really have an ending. The last hope of Purple Moon was actually based on a terrific concept, a sports game for girls. The company recognized the rise in popularity in soccer among girls and had an opportunity to develop a soccer computer game for girls. Unfortunately, their soccer program told the story of getting ready for the big match, but never actually let the girls play soccer.

All is not bleak. Innovative examples of game software, such as *Dance Dance Revolution* (DDR) for the Sony PlayStation,allows players to dance on a physical pad and interact with the screen. Girls love DDR and play it until they lose weight and their dance pads wear-out. They just do so at home with friends. The arcade DDR machines are played primarily by boys who engage in a less playful, more competitive version of the activity.

Perhaps the least understood development in software for girls was the enormous late '90s success of Mattel's *Barbie Fashion Designer* software. Regardless of how you feel about Barbie, this software title sold more copies than any other piece of "girls" software ever. The industry observed the breakthrough sales of this product and wrongly attributed its success to the fact that Barbie was on the box. This simply is not true.

There has been unsuccessful Barbie software on the market for nearly twenty years and there were other Barbie titles next to *Fashion Designer.* So, why did *FD* sell so well? I would argue that its commercial success had far less to do with Barbie than with constructionism. *Barbie Fashion Designer* allowed girls an opportunity to use their computers to make something cool – in this case clothes you could design, print and dress your doll in. Constructionism trumps even Barbie. This is a lesson we would do well to heed.

#4 There is More to Technology than Notebook Computers

It would be a great mistake to suggest that the latest PDA gizmo or thin-client is superior to a full-featured notebook computer. Many of these devices are intended for professionals with a specific job to do. Kids need better computers than most executives. I am quite unimpressed with those who can turn word processing and web surfing into a nine-year scope and sequence chart.

School computers may be used to do work and to learn. Work consists of writing, calculating, researching and presenting information. Learning consists of being immersed in the constructive processes with a reasonable chance of leading to the construction of a larger theory or bigger question. Microsoft Office is OK for doing work. MicroWorlds Pro is superior for learning.

"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."[3]

Those who make claims that schools should use such devices rather than notebooks probably have little experience using computers in creative ways and are probably more concerned with cost than benefit to children. We learn by constructing knowledge in a social context. Such construction is dependent on full-featured computers capable of making all sorts of wondrous things and sharing those things with others. Serendipity should be the goal. It is arrogant and misguided to put too much stock in what we think kids might do with technology. I embrace the wondrous inventions that enliven classrooms and stimulate even greater inquiry.

Software is another cause of confusion. Some educators are impressed by false complexity, software loaded with confusing features, tools and menus. The logic suggests that hard-to-use, expensive, or corporate software must be superior to the silly stuff developed specifically for kids. New need not mean better and pretty need not mean deep. We should endeavor to use as few software packages as possible, if of course those packages are sufficiently flexible, so that students may develop fluency. MicroWorlds use pays dividends after students have ample time to allow the software to become second nature. Jumping from software package to software package may impress adults, but it will cheat students of the benefits paid by fluency.

#5 We Have Good Role Models for Girls

One of the most effective ways to learn is through apprenticeship. Children learn a great deal, with little effort, from spending quality time engaged in authentic activities with adults. These adults inspire, teach and motivate through their example. It makes sense that if we want girls to be competent engaged computer users, then the women in their lives need to be competent engaged computer users. Most of the women known to children are teachers and yet they are among the weakest users of computers in society.

The critical shortage of teachers with demonstrable levels of computer fluency makes it difficult for girls to see the value of computing in their reflection. Carol Gilligan's research suggests that during the early years of adolescence when girls begin to shape their identity, they also begin to see women marginalized by society. Teachers have a responsibility to be much better high-tech role models, computer clubs for girls need to be created and a public campaign must be waged to attract girls to hobbies and vocations involving computer technology.

#6 Girls Should Study Technology Criticism

Dale Spender once told a room full of educators that schools need to teach girls to criticize technology since for a number of reasons, including that women were being "routinely raped and molested online." This hysterical proclamation was made prior to the widespread availability of the World Wide Web.

While we should be cautious to ensure the safety of all children, we do not need to raise irrational concerns. Reactionary criticism of "technology" (whatever that means) is like criticizing the weather. You will lead a rather unfulfilling life.

While it may be useful to be knowledgeable of the benefits and consequences of emerging technologies, criticism requires little intimate knowledge of the subject and renders the critic a spectator. Girls cannot afford to remain spectators in the use of the most powerful instruments of science, art and commerce ever invented. If girls wish to lead happy productive lives they will need to learn to cut code, to master the instruments of so much influence. We must move beyond hoping that our daughter will marry Bill Gates to a day in which our daughters compete successfully against him. This is a necessity if computers and software are to ever become more attractive and convivial for the majority gender.

#7 School Administrators are Qualified to Make Important Technology Decisions

School administrators like the marketing benefits associated with standing next to a group of kids and a computer, yet few have ever done anything imaginative with a computer. Unprecedented budgetary and educational discretion have been placed in the hands of technology directors who often have little knowledge of or concern for the learning needs of children. This abdication of responsibility has cost schools billions of dollars and squandered all sorts of good will and opportunity to innovate.

#8 Schools are Designed to Sort Children

American schools are being destroyed by the over-emphasis on higher-meaner-tougher standards and the quest for high-standardized test scores. California spends nearly $2 billion (US) annually on the administration of a testing scheme non-aligned to the curriculum and which can't even seem to be scored correctly. Teachers are prohibited by law from looking at the test and receive no more than a score reporting on each child's results yet are expected to improve practice based on this score.

Some schools spend as much as eleven weeks per year in external assessment in addition to the

countless wasted hours of test preparation. Recess is being eliminated in some schools. Science, social studies and the arts have disappeared to make way for more literacy and numeracy based on a pedagogy of yelling louder more often. Students are being tortured by this nonsense and great teachers are being driven out of the profession. Schools are deemed failures and susceptible to takeover while children are kept from progressing to the next grade based on norm-reference tests requiring 50% to fail. This is the cruelest of hoaxes perpetrated on children. The publisher of California's exam includes teacher instructions in the event that a student vomits on her test booklet.

One principal recently committed suicide as a result of her school's test scores.

These tests serve no productive purpose and are cheating children of a joyous purposeful learning experience. Citizens of conscience must oppose this wholesale deprivation of educational excellence at every opportunity.

Australian independent schools do not have to play this game, yet they do. Complain all you want about the Department of Education, but your schools have the power to reject or at least influence, the trajectory of these accountability schemes.

This is not the case. In the years since I began working with Australian schools, local girls' schools have not only capitulated to the VCE, but have embraced the odd little International Baccalaureate. Say what you like about American imperialism, but even we don't have the audacity to dictate your curriculum.

The greatest tragedy is that local independent schools not only lack the courage to fight this scourge, they actively promote their scores in a most cynical attempt to gain market advantage over the competitors.

I spent some time looking at the web sites of local girls' schools and was sickened by an animation of a cute little girl with text scrolling over her announcing this school's test scores. Perhaps the advertisement should say things like, "Our school makes more girls cry and nauseous than any other school." Or "our girls crushed the dumb girls down the street." How about, "our school wasted more precious resources on cheap marketing stunts than our competition?"

I often feel like the Great Gazoo when I attend educational conferences. If you don't remember Gazoo, he was the Martian who inexplicably visited Bedrock in the Flintstones. Terms like set tasks, packets of work, VCE scores, marks, CATs, outcomes or league tables are the words of Dickensian shopkeepers, not people who love children.

Girls deserve schools that do everything possible to create nurturing environments capable of honoring their emotional, intellectual, spiritual and creative needs.

Conclusion

If we believe that children are a blessing entrusted to us, then what we do should be self-evident. The choice of educational direction is not related to education party, region or grade level. We must choose between a belief in constructionism, the notion that learners are central to the learning process, or instructionism, the idea that we can improve education by teaching better. Better teachers will undoubtedly create rich environments in which students feel safe to take risks, explore their curiosity and share their knowledge. However, it is impossible to learn for anyone else no matter how hard you try. Constructionism gives agency to the learner, instructionism to the system/curriculum/teacher. Our goal should be "less us, more them."

Schools need to do a better job of engaging all learners, listening to them and building upon their natural expertise, knowledge and talent. We need schools in which children are engaged in authentic, personally meaningful tasks in conjunction with adults who can inspire them to greater heights. Abundant computer access and high expectations for the myriad of ways in which computers may be used as intellectual laboratories and vehicles for self-expression must be the norm. Adults, particularly women, have a major responsibility as role models who develop and use sophisticated computer users. We need to think less of female students as precious Victorian-era dolls and more as competent citizens who can compute, solder and take responsibility for their own learning. They deserve no less.

[1] This is not a scholarly paper. It is intended as a manifesto to accompany a keynote address. This print document cannot reproduce the examples, video clips, anecdotes, humour and passion shared during the conference. The books I love and learned from may be found at http://www.stager.org/books/. A collection of my articles about education may be found at www.stager.org.

[2] *Real time Computers, Change and Schooling* - National sample study of the information technology skills of Australian school students

Merydth, Russel et al.
October 1999

[3] Hillis, Daniel. (1998) The Pattern on the Stone: The Simple Ideas that Make Computers Work.