How Computers Make Our Kids Stupid
By Sue Ferguson

The first thing you notice opening the door to Les Black's classroom is the smell. It's a dank, earthy aroma from a dozen planters perched on shelves or suspended from the ceiling. Sunlight filters through a row of wood-framed windows onto the 27 fourth-graders. A boy standing at the front relates the story of his grandfather's life, impressing upon his audience that the old man did not always act within the letter of the law. His classmates squirm in their seats. Some fiddle with pencils. One boy thoughtfully caresses a papier mâché snake resting on his desk. Behind the presenter is a chalkboard and, above it, the age-old series of placards displaying the alphabet, exquisitely drawn in cursive form.

This scene in a private school in the Toronto suburb of Thornhill is not unlike thousands of others across Canada. But wait a minute -- something is strangely amiss. Where are the keyboards? Where are the darkened screens framed by dull grey plastic? The tangle of cables cascading over the backs of the tables? How strange: a classroom without a gigabyte in sight, not even on the teacher's desk. How will these children ever get a job? How will their teachers ever instill in them a love of learning?

It's never been easier for kids to get their fingertips on a keyboard or to cruise cyberspace. Statistics Canada reports three out of four households with school-aged children regularly access the Internet, and a growing number of users are turning to high-speed connections. Our schools now have about a million computers, 93 per cent of which are online. Although we already boast a 5:1 ratio of students to computers (compared to an average of 8:1 in the developed world as a whole), the push is on in many districts to equip each middle- and high-school student with a wireless laptop. With homes and classrooms crawling with mouses and modems, anyone resisting the digital impulse seems either hopelessly naive or in a state of downright denial.

Yet, in bucking the trend, the Toronto Waldorf School -- home to Les Black's class -- is arguably doing its students a favour. While computers clearly have a place in education (Waldorf introduces them in Grade 9), the evidence is mounting that our obsessive use of information technology is dumbing us down, adults as well as kids. While they can be engaging and resourceful tools for learning -- if used in moderation -- computers and the Internet can also distract kids from homework, encourage superficial and uncritical thinking, replace face-to-face interaction between students and teachers, and lead to compulsive behaviour.

At least some teens recognize the problem. Fifteen-year-old Colin Johnson of Toronto sits down at his computer at 4 most afternoons. He whizzes through his homework in half an hour, and then starts surfing, gaming and chatting with friends on MSN until 1 a.m., when he goes to bed. The tenth-grader is failing science, but otherwise getting by. "I procrastinate a lot more than before," he says, acknowledging that "everybody's marks suffer to some degree" if they spend as much time as he does online.

Perhaps the most persuasive evidence for taking a more critical view is a broad-reaching and rigorous study published last November. University of Munich economists Thomas Fuchs and Ludger Woessmann analyzed the results of the
OECD's PISA international standardized tests. Not only did they tap into a massive subject pool -- 174,000 15-year-olds in reading, 97,000 each in math and science from 31 countries (including Canada) -- but they were also able, because participants filled out extensively detailed surveys, to control for other possible outside influences, something remarkably few studies do. Their results, which are only now starting to make waves among pedagogy experts, confirm what many parents have long intuited: the sheer ubiquity of information technology is getting in the way of learning. Once household income and the wealth of a school's resources are taken out of the equation, teens with the greatest access to computers and the Internet at home and school earn the lowest test scores.

At school, the economists found, some exposure to computers seems beneficial. For instance, students who never or rarely use the Internet and computers in the classroom don't do as well as those who make moderate use of them. But the difference in achievement levels is significant in math and science only, not in reading. And those same computer-less students outperform peers who frequently access the technology. The optimal level for computer and Internet use at school, Fuchs and Woessmann suggest, is pretty low, somewhere between "a few times a year" and "several times a month." Seventeen-year-old Tilo McAlister has some idea why that may be so. By Grade 7, the Waldorf student was aware that friends in other schools were more computer-savvy than he. (McAlister had limited use of his father's home-office computer at the time.) Upsetting as that was to him then, four years later, he has caught up. And "looking back," he says, "I'm glad I didn't have them in school. Anything I would have learned from a computer, I'm sure I learned better from a teacher."

Irene Freeman is Brooke Elementary School's resident technology guru. The 63-year-old teacher first introduced computers to her Delta, B.C., classroom in the early 1980s. She's since facilitated the installation of the school's computer lab, designed the school's website, led countless workshops for teachers, and spent two years as an e-learning consultant for her district. Now in the last of 39 years of teaching, Freeman takes every opportunity to put her first-graders on the road to becoming seasoned technophiles. Along with twice-a-week trips to the lab, her 23 six- and seven-year-olds spend a chunk of each day in front of the five hand-me-down computers in her classroom, where they navigate a selection of commercial educational software and Internet sites.

Freeman estimates she delivers about a quarter of the curriculum in this way. "In September, we talk about the parts of the computer," she says. "Where to put your left hand, your right hand -- and they play games with the alphabet." By the end of the school year, the children (who have already used computers in kindergarten, though not as extensively) can, among other things, write stories, draw pictures and insert them into documents, build geometric patterns, organize their thoughts (with the help of a graphics program called Inspiration that prompts them to "web," or connect, their ideas), and even create slides for a PowerPoint presentation. Freeman's convinced that computers help students master the alphabet, reading and writing more quickly than they would in a tech-free environment. "Pretty well all the kids really like it," she notes, "so they're motivated to learn."

The computer is frequently cited by educators as the great motivator. "It's not that you couldn't teach without it," says Brooke principal Barbara Hague, "but we need everything in our power to keep kids engaged." More significantly, however, PCs are part of their world. If schools failed to integrate them into the curriculum, she insists, "we'd be missing a huge part of their life -- it would be like not including physical education" in the school day.

Yet the accoutrements and relentless upgrading they demand are expensive. At Brooke, which is located in a solidly middle-class neighbourhood, parents are helping foot the $10,000 cost of an upgrade to the lab this spring, which added 14 computers for a total of 32. And although some have questioned the school's priorities (especially as spending on "all
aspects of school life," says Hague, has been cut back in recent years), the students' current level and sophistication of
use means they need to be working at their own screens. "They're way beyond sharing."

The push for more -- more modules, more speed, more software -- can take on a life of its own. In fact, labs and
classroom PCs like those at Brooke school are considered dinosaurs -- "not that different from someone wanting to
install an eight-track tape player in a 2005 sports car," according to Ron Rubadeau, superintendent of schools for B.C.'s
Central Okanagan district. Students don't get enough time in labs, he stresses in a report released earlier this year,
"Technology Unplugged," and classroom modules are located "in spaces that may already be too cramped to fully
accommodate student learning." The wave of the future is wireless laptops which, although "costly," will lead "to an
improved focus on teaching and learning," he predicts. That's the same reasoning behind the province's $2.1- million
program to equip each child in select Grade 5 to 12 classrooms next fall with their own laptop computers.

Rubadeau's confidence is born of a seemingly impressive stack of research. When 1,150 Grade 6 and 7 students in B.C.'s
Peace River North school district were given their own Apple iBooks, for instance, writing skills improved (especially
among students whose teachers were more experienced with the technology), and the achievement gap between girls and
boys, and between non-Aboriginal and Aboriginal students, narrowed. Studies from Quebec, Maine and Maryland,
where iBooks have been used for a few years, back up those results. Wireless laptops distributed on a one-to-one basis,
concludes Rubadeau -- whose middle and high school students are part of the province's initiative -- are "revolutionizing
instruction."

Now surely that should silence the critics -- the parents, educators and others who have, over the years, objected to the
massive outlay of cash on what they argue is an unproven medium. (No one has kept tabs in Canada, but in the U.S., one
estimate puts the federal expenditure on digitizing schools at nearly $6 billion a year.) Yet, rather than clamping up in
the face of such persuasive evidence, the opposition, like a dog with a bone, has grown bolder -- and has its own
growing body of contrarian evidence, including the Munich economists' study. "The jury is in," says Alison Armstrong,
"There's no compelling evidence that computers help develop intellectual or emotional intelligence in any way."

South of the border, the Alliance for Childhood, a group of 60 health, child-development, education and technology
experts, has called for a moratorium on new computers for preschool and elementary classrooms. In its report "Fool's
Gold: A Critical Look at Computers in Childhood," the Alliance argues, "We do not know what the consequences of
such a machine-driven education in adulthood will be. But we suspect that they will include a narrower and more
shallow range of intellectual insights, a stunting of both social and technical imagination, and a drag on the productivity
that stems from imaginative leaps. In short, a high-tech agenda for children seems likely to erode our most precious
long-term intellectual reserves -- our children's minds."

Meanwhile, the Munich economists found that on the home front, kids without a PC do better than those with one or
more. This changes only when specific computer uses are taken into account. Educational software, email and web page
access -- and this will come as no surprise -- are associated with higher achievement than gaming or chat rooms,
precisely the activities on which teens spend the most time. Or, as a new British Department for Education and Skills
document advocating e-learning puts it, booting up at home can be beneficial, "but not many pupils have yet integrated
such uses with their school experiences."

So, it's quite simple, really. There's no harm in buying your teen his own computer and dedicated Internet access, so long
as you're confident that the Encyclopedia Britannica, and not an online game of Doom, will keep him glued to the screen.
And while American author Steven Johnson argues in his new book, *Everything Bad is Good for You*, that video games and certain popular TV shows are making the next generation smarter (because their multi-layered, unresolved soap-opera plots stimulate under-used neural pathways), this sort of virtual multi-tasking clearly has its drawbacks. Not only, as Fuchs and Woessmann propose, can recreational uses be a distraction, crowding out time spent on homework, but our brains -- at least, once we go to work -- appear to suffer in other ways. According to a University of London study commissioned by Hewlett-Packard, the constant interruption of employees' concentration by emails and telephone calls lowers a person's IQ by 10 points -- more than double the four-point drop that results from smoking a joint.

One reason students don't "integrate" their school work with their home computer use, the British government report goes on to suggest, is that "teachers do not have direct control over what pupils do outside school hours." In many ways, this goes to the heart of the issue. Computers don't, on their own, dumb us down. But so long as schools treat computers as if they are indispensable, and teachers continue to assign homework that either requires or assumes research will be carried out on the web, kids will inevitably be pulled into gaming, chat rooms and other distractions. This, as Woessmann and Fuchs have shown, bodes poorly for their achievement levels. It also arguably interferes with their capacity for deep and sustained reading, thinking and understanding -- a point *Everything Bad is Good for You* author Johnson eventually comes around to acknowledging. "Now for the bad news," he writes at the end of his book. "Complicated, sequential works of persuasion, where each premise builds on the previous one, and where an idea can take an entire chapter to develop, are not well-suited to life on the computer screen."

And it's not just the students who are losing out. Heather Menzies, author of the recently published *No Time: Stress and the Crisis of Modern Life*, and York University sociologist Janice Newson surveyed 100 faculty members from six of the country's universities. About a third of them reported short-term memory problems and difficulties concentrating, which they link to the digital revolution. Seventy per cent said that rather than read deeply, reflectively and broadly, they scan for usable bits of information. What's more, the overwhelming use of email is affecting their interactions with students and colleagues, making communication more "superficial" and less personal.

As for why kids with a surfeit of school computers don't perform as well as others, Fuchs and Woessmann suggest what Waldorf student McAlister suspects about his own experience: time spent at the screen may crowd out personal interaction with teachers and creativity. They're referring to the 15-year-olds in their study, but in an interview, Fuchs speculates that younger children whose lessons depend excessively on computers suffer even more. "I would suggest that for the reading literacy of nine-year-olds, very frequent computer use at school could have a more severe effect, since the learning of reading requires a lot of interaction between teachers and students." The general message of the German study is this: at home and at school, computers may well have a time and a place, but not just any place and any time. As Canadian schools eagerly embrace the next wave of e-learning -- and PCs, laptops and the Internet become as common as pencils and erasers in ever-earlier grades -- it's not clear that message is getting through.

All this makes it harder to accuse the staff at the Toronto Waldorf School of being either naive or living in denial. "We're not Luddites or anti-computer," says the Toronto school's faculty chair, Todd Royer. "But we are for introducing important technologies at the right time in the development of children." The right time for computers, he says, arrives in Grade 9, when students move from a purely sensual, experiential curriculum to a more abstract, conceptual level of learning. According to the Waldorf approach -- first espoused by Austrian philosopher and scientist Rudolf Steiner in 1919 -- the elementary years are for engaging children with natural phenomena, like gardens, animals and light. The child is expected to store such encounters in her memory and, from an accumulation of experiences, create and test her own concepts. In experiencing (as opposed to intellectualizing) the world, says Royer, students come to develop their
capacities for wonder, interest, reverence and love -- a key step in "holding their intellect in check so that they can deal with it responsibly."

Computers are of no use in this process. "They don't present us with phenomena," he explains. "They present us with something that is pre-digested -- a concept of something" created by someone else. For the same reason, textbooks are also scarce in Waldorf classrooms. The children write and illustrate their own records of what they've learned using good, old-fashioned pens, pencils, crayons and paper. That process, says Royer, goes a long way toward building a child's self-esteem -- a task the Waldorf elementary curriculum puts front and centre in the belief that intellectual life should develop from emotional and moral maturity.

Letting a child loose on the Internet (where three million new web pages are created every day) before they've developed a strong sense of self, he says, "can extend them beyond their capacity to understand." They lack the maturity to deal with it responsibly. Obsessive use of the Internet is a prime example. Not only can gaming and chat rooms distract a kid from homework, but more than 10 per cent of students show signs of compulsive Internet use, experts say. In such cases, cautions University of Calgary computer scientist Tom Keenan, computers themselves are not to blame. "There's always something to take kids away from studying. Thirty years ago, at universities, it was bridge." But whereas card games require some effort to coordinate, the Internet is "ubiquitous and cheap," he adds. And in the absence of parental supervision, "it's always ready for you, always friendly, always happy. It's the crack-cocaine of time-wasters" -- a point some kids are well aware of. "MMORPGs" (massive multi-player online role-playing games) "are highly addictive," notes Toronto teen Colin Johnson. "A lot of people have screwed up their lives playing them." In fact, one Sony product, EverQuest, in which gamers create characters using "a powerful customization system for unprecedented player individuality," according to the company's website, is widely known as EverCrack.

Even more troubling, notes Royer, is that the things kids read and see online invoke their imagination. The recent incident at Royal St. George's College -- in which two boys (one Jewish) at the Toronto private school spewed anti-Semitic insults at a chat-room participant, Rod (a moniker for four Jewish girls from another private school) -- is a case in point. Not only did one of the students pick up some of the racist vocabulary from surfing the web in the first place, but it's not clear he fully understood the impact of posting his diatribe on the Internet. In a cyberworld glutted with undifferentiated information, students desperately need to be able to distinguish valid information from hate propaganda and other irresponsible messages. In light of such incidents, it doesn't seem entirely grandiose when Royer suggests, "The force of thinking is like the power of the gods that we hold in our hands. We have the power to do incredible things, both for good and evil. It's a force that needs to be protected within humanity."

The Waldorf school's 100 high school students share a modest 17-unit lab for a limited menu of courses -- math, programming and business. In waiting until a child's character is more fully formed, Royer hopes his students will understand computers for what they are, a tool, and use them responsibly. Student McAlister does much of his homework on the PC he recently bought for himself, and acknowledges that the allure of surfing, downloading music and email was initially a distraction. But he started to feel guilty, his marks were dropping, and, he says, "that got me to get on top of it" -- without parental nagging. Classmate Kaz Iguchi transferred from the public system to the Waldorf school in Grade 9. "I close all other programs so I don't get distracted when I do my homework," he says. A one-time video-game aficionado, he sold all his games in January. Iguchi, 17, credits his school environment with that decision. "In Waldorf, not many kids play games," he says. "If I still went to a public school, I'm pretty sure I'd still be playing."

As for the standard rationales for digitizing the classroom, Royer trots out a variety of curt responses. To the claim that the world is full of computers and schools need to be relevant to children's lives: "The world's full of all kinds of things -
- automobiles, sexuality, and we have appropriate times and places for all these aspects of our lives." But surely engagement is an issue. Don't kids get revved up about lessons presented on a computer? "Sure," he responds. "It's an addictive medium." Okay, what about helping students gain the skills they need to get a job? "Our grads go everywhere and anywhere."

This last rebuttal is less impressive when you consider that Waldorf is a private school with tuition fees between $11,000 and $12,200. Most of its students, in other words, are going to be ahead of the curve by virtue of their advantaged background. But it's also the case that a 2005 survey asking Canadian corporate leaders what they look for in new hires consistently emphasized self-discipline, an inquiring mind and loyalty over technical know-how, which can be picked up on the job. Add to this evidence cited by Fuchs and Woessmann that computer skills have no substantial impact on an employee's wages, while math and writing abilities do, and Royer's glib response gains credibility.

Delta teacher Irene Freeman is also a big believer in hands-on, experiential learning. The first week of May, her class spent a morning making strawberry jam for Mother's Day, arranging baby food jars of preserves in baskets fashioned out of berry containers woven with strips of coloured paper, topped off with a homemade card -- no mousing or keyboarding required (except for Freeman, who found the design for the cards on the web). But even experiential learning can be digitized. For one previous project, her students picked fallen leaves, which Freeman then laminated. After writing about where they found each leaf and what kind of tree it dropped from (using Microsoft's Talking First Word software), the students mailed their work to dozens of other North American schools participating in the same project. In return, says Freeman, "we got some unusual looking leaves -- from trees like the sugargum in Florida." The experience "didn't replace books," she stresses. "We started by reading The Giving Tree by Shel Silverstein," and ended by looking up the leaves they were sent in reference books.

It's hard to see much harm in such judicious use of technology. But for every positive example, there are other troubling ones. Of course we hope our kids will discover that mouses, websites and email are useful educational tools. But as we allow curricula and computers to cozy up ever closer, we risk letting technology run the show.

http://www.macleans.ca/education/universities/article.jsp?content=20050606_106930_106930