

E-Books, E-Kids, E-Flat!

Three trends schools will ignore at their peril

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Synopsis for E-books, E-Kids, E-Flat!

This workshop explores three major changes being evidenced today: 1) the prevalence of ubiquitous digital information sources, 2) the defined attributes of a "Net Generation", and 3) the rise of a global economy. Each change will be discussed along with strategies that schools and educators can use to stay relevant in their students' lives. For warned is for armed!

E-books, E-Learning, E-Gads!

Activities

My *personal* e-book must have:

(Edward De bono?) Activity

Imagine a situation in which every student and teacher in your school has a practical, powerful e-book with access to nearly an unlimited number of books and other educational resources through it. Using the form below, jot down some ideas about what may be good, what may be bad, and what is interesting about this scenario. (You must have some ideas in each column.)

What's good?	What's bad?	What's interesting?

Is Educational Climate Change Ahead?

Like many educators, I am impatient for the kinds of educational changes that will make schools better able to meet the needs of today's and tomorrow's students. But unlike many change advocates, I am old and cynical about schools being able to change themselves. My experience has been that only forces from *outside* the established educational community create fundamental changes in schools - for good or ill. Schools are, after all, about preserving culture and the current social structure, not fomenting revolution.

But I believe a meteor is on the educational horizon that will so dramatically alter the school climate that our current dinosaur-friendly environment will cease to exist and give rise to a new breed of educators - *affordable 1:1 computing*.

Why am I thinking about this today?

Because just last week I was a part of a group of local educators who spent six hours attending a workshop delivered over interactive television. I noticed a few things about the day's stand-and-deliver experience:

- Adults have no more patience with un-engaging materials than kids have.
- Everyone's standards for engagement are rising. Are we all becoming ADD?
- Technology itself does not make an educational experience engaging.
- Given the opportunity, learners *will* find a way to be engaged – with or without the teacher's help.

About half of us had laptops. Our venue provided guest wireless access. So work/learning continued for those of us with laptops - even when the program was about something we had already heard, was something we already knew, or was simply not delivered in style that invited attention. (I am trying to say this politely since the presentations were no better or worse than any one would see at any educational conference. But the MEGO – My Eyes Glaze Over – factor was about at 8.5.)

Those of us with our own means of engagement tuned out - at least partially. We've all seen this happen at meetings and workshops - anywhere people have access to computing devices and a means to get online. Marc Prentsky says "Engage me or enrage me." I don't know that the situation is that dramatic - "Engage me or something else will." seems more likely.

What will happen when parents both provide wireless access devices for their kids *and* demand that their children have access to them through out the school day? The calls by parents for student cell phone access grow after every school shooting. The line between cell phones and PDAs and laptops is blurring more everyday.

We need to begin to identify the skills and practices of teachers who survive this meteoric change of a classroom environment – the new climate where engagement/distraction is always available and to every student. I'd put my money on those who:

- are diagnosticians who use technology to help them create effective Individual Education Plans for *all* their kids using evaluation data that is accessed and manipulated electronically
- are masters of differentiated instruction
- can identify, organize and prescribe online learning activities
- understand and use the concepts of gaming in learning
- communicate online effectively and easily
- lead dynamic and engaging discussions
- team with other educators to specialize in learning styles rather than content areas

What do you do when you have their bodies in your classroom, but their minds are everywhere but? I hope our pioneering 1:1 laptop educators in Maine and Africa and elsewhere will be offering guidance!
Climactic shift brought on by that big meteor was bad for the dinosaurs, but where would we mammals be without it?

Oh, it's worth following MIT's \$100 laptop project. Nicholas Negroponte and his team are cranking our powerful but inexpensive laptop computers and seeding third world schools with them. It's not whether, but when, the \$100 laptop becomes commercially available here. <laptop.media.mit.edu>

A Library in Your Hand: The Impact of E-Books on Schools and Libraries

The technology of "the book" has already seen a number of transitions in its long history: from clay to wax to papyrus to vellum to cloth to paper, stored as tablets or scrolls or folios or books, bound in horn or leather or cloth or paper. With each metamorphosis, the role of the librarian has changed – from scribe to guard to copyist to archivist to selector to teacher.

I, for one, am looking forward to the next iteration of “the book” when well-designed silicon replaces cellulose as the means for publishing. Our current paper books often rapidly disintegrate. They go out of print. They are expensive to produce, bulky to store, and back breaking to move. Access to them is limited because of their very physical nature. While I am sentimental about the associative memories particular books evoke, it is really the excitement of the story, the perspective of the author, or the lyricism of the language to which I am reacting when I say, “I love books.”

The impact of the wide-scale use of e-books will be a major who-moved-my-cheese event for our profession and it will happen within many of our working lives. What might a genuinely useful e-book look like and what ramifications might such a device might have on the profession of school librarian? For each prediction, I have footnoted a current product or event that foreshadows it.

The e-book of 2015 (1)

The digital book in its mature form will have many advantages over that of the now defunct Sony Bookman, cumbersome, expensive laptop, or handheld device with its tiny screen. It will be a new kind of book with which one can cuddle up in bed, take to the beach, or carry on a bicycle. From reports of developing technologies, one may safely conclude a true e-book:

- **Will be highly portable, durable, and customizable.** Mine will be a slim padded six by nine inch notebook bound in calfskin weighing ounces, not pounds. (2) It will run on a watch battery that needs replacing once every three years, supplemented by a solar panel (3). It will have high-speed wireless connections to the Internet and peripheral devices, such as projectors, printers and earphones. (4) All its memory is static and the screen is made of strong, semi-flexible plastic. (5) A bump or drop may scuff, but not break the device. Special models for students needing adaptive technologies will be available.
- **Will offer a screen with higher resolution than the printed page.** Open my e-book and the left hand side will show a softly glowing, backlit, glare free screen that can switch from landscape to portrait layout. (6) My wife can sleep while I read in bed. My page's background would be a rich ivory color with the resolution of paper and be flicker-free. The text's font can be changed to suit one's personal taste and the size adjusted for aging eyes. A tap will bring up a dictionary definition and pronunciation for any word, and in many cases, an illustration. Automatic translation of texts in languages other than

English is instantaneous. (7) The other side of the notebook will hold input and output devices of my choice - keyboard, track pad, stylus, speaker, microphone, and camera.

- **Will be fully multimedia.** The page displays full color graphics, digital video and offers text to speech in a natural voice. (I'll download James Earl Jones and Kathleen Turner to be my narrators.) Audio books with full dramatization and magazine and newspaper articles can be downloaded and listened to, as well as motion pictures, radio programs, and television programs. (8)
- **Will allow annotation, searching, and bookmarking of e-texts.** One can doodle in the margins with a stylus on the touch sensitive screen or via the keyboard on electronic sticky notes. The user can search the full text and notes and set referenced bookmarks.
- **Will have both internal and online storage space.** Dozens of books plus all standard reference sources will be instantly accessible from the terabyte storage chip within the device. Lesser-used items will be accessible from online personal libraries, through worldwide public or private lending sources, or through online bookstores. E-texts and downloadable audio books will be less expensive than their physical cousins, reflecting cost saving realized by not having to print, transport, store, or remainder any item. One of my books happens to be a great Dorothy Dunnett novel, unavailable in paper for 10 years. E-books mean never having to say out of print.
- **Will change the nature of "fiction."** Many writers may experiment with text that is customizable by the end user for both artistic and commercial purposes. The reader may substitute the name of his or her current inamorata or inamorato for the protagonist (or murder victim). The latest Stephen King can be set to mild, scary or terrifying, or Harold Robbins to suggestive, lurid, or ... well, let's not go there. Video games and fiction may merge and the skills and choices of the reader/player may determine the outcome of the plot. (9)
- **Maybe integrated into a more fully functional "e-backpack."** This device will be a means of storing notes, papers, and teacher-generated study materials and customized e-textbooks; an e-portfolio documenting the exploration of a series of related topics, each assignment building on the last; an e-organizer with appointment calendar, to-do-list, and address book; an e-wallet that serves as a library card, lunch ticket, petty cash, and sports pass protected with biometric security; and an e-communicator capable of transmitting both voice and data, including digital video. The e-backpack will include interactive learning programs prescribed as part of every learner's IEP and include basic productivity software such as a word processor, spreadsheet, web editor, database, video editor, and graphics tools.
- **Will be affordable. (10)** The price of e-book hardware is a non-issue. The devices themselves will be no more expensive than school supplies in the past. Software distributors and e-text publishers practically give them away with subscription services. The funds schools once spent on textbooks and printing costs heavily subsidize the costs of this equipment for children whose families cannot afford it.
- **Will contain a monitoring chip.** With the passage of the Patriot Act of 2009, all electronic communication devices used in schools will have a Mind Police chip that automatically sends logs to the school's office of testing and assessment, the vice-principal's office, and the Department of Homeland Security for data-mining. Of course, all students have discovered how to disable the chips. (11)

The students of more well to do families are using newly available wearable e-books with a wristwatch type CPU, retinal laser displays, and virtual keyboards. That kid in the back row is probably twitchy because she's paging through *The Hobbit*, solving a chemistry problem, or drawing her friend a valentine.

Implications for the role of the librarian.

The practical e-book will have a more profound and far more sudden effect on the role of than librarian than did the printing press. Just as printed books freed hand copied manuscripts from the chains that held them to a library's tables, so will e-books free the content of books from any particular physical space. How might our spaces, tools and jobs change as a result?

1. **The physical library.** Schools will be made of bricks and mortar for as long as they are expected to provide not just educational, but custodial services by the public. While home schooling and virtual schooling are growing, both serve a small fraction of the total PK-12 population. Most families will expect schools to contain and shelter their children as well as educate them. But will the library itself remain a physical entity when all the resources of today's library and more are accessible via an affordable, practical e-book?

The library should house the infrastructure technologies needed to insure that e-books connect to each other and the rest of the world. It is also the logical place to house the technical staff where one of our tasks will be help them prioritize their tasks and possibly supervise. A production lab containing computers with massive processing power used to do high-end image and video processing and number crunching will be a part of tomorrow's media center.

The library will remain a physical learning space if we begin creating facilities and environments where kids and teachers *want* to be. The library must have comfortable chairs, a pleasant ambiance, and a friendly, low-stress, safe, and forgiving atmosphere. (12) It must contain flexible spaces that can be used by individuals, small groups, and whole classes. Physical books that still have value but are not yet digitized, may still be present, but will eventually be sent to historical society or university archives where they can be better preserved. Security systems will be a thing of the past since there will be no "books" to steal.

Collaborative learning and the need for social interaction will require our libraries are places of active learning. While the e-book will make virtual communication readily available, providing a place for face-to-face interaction is role the library can fill. I personally hope that storytelling, puppetry, live debates and demonstrations will be part of every child's education. And while most of a child's education will be highly individualized to meet specific learning goals and styles, interpersonal and collaborative skills will also be a part of the curriculum.

As librarians, we will need to compete for patrons using our space. Since we are no longer the only game in town for information, it will be our skills, especially our interpersonal skills, to which patrons will be drawn. The librarian needs to be a good reason to go to the library rather than to avoid the library if we are to exist. (13)

If the library is not a wonderful place to be to learn, to socialize and to relax, students and teachers will use their e-books in places that are.

2. **Resources.** The librarian, of course, will be selecting commercial digital materials to be made available to students and to staff. While it may mean continuing to purchase some single titles of resources, it will more likely be the librarian's job to purchase access to collections of digital materials. (14) These collections will need to complement and supplement state-provided resources (15), the commercial Internet, and materials that come standard (dictionaries, thesauri, atlases, etc.) on e-books designed for school use. And of course, it will be librarian's job to budget for, acquire, and track the licenses needed to use these products.

Materials will need to be even more carefully chosen to support the curriculum and specific instructional needs of teachers. With so much information available, maintaining a highly useable library webpage

tailored specifically to meet the needs of the individual school's curriculum will be a primary job of the librarian.

The librarian's expertise, available online and accessible through e-books, may be the single most valuable "resource" the library will offer. The questions will be difficult and we will need to not only have expertise ourselves in locating specific materials, resources and information, but be able to use expert systems that rely on artificial intelligence as well. (16)

3. **Jobs.** Teachers and administrators must come to us for help with problems only we can solve. As printed textbooks become obsolete, librarians will use the experiences and skills learned creating pages of selected web sites and webquests to assist teachers in building individualized (to the student) e-textbooks accessed and read on e-books. We will still need to be experts in children's and young adult materials – regardless of their format – to meet the needs of both the struggling and advanced learners. And we will continue to provide staff development opportunities in information technologies.

Classroom teachers will continue to send kids to the library only if the librarian is better at helping them find information or complete a task than the teacher himself. We also need to have responsibility for teaching an identified set of skills, virtually and in person, which no one can teach better. (Might the very best teacher-librarians free-lance to schools willing to pay for their teaching talents?)

Information-literacy skills will be more important to student's future success than ever. Because of the growing glut of information, we will to increasingly focus on helping students:

- Define their information-related problems and questions.
- Search ever-larger amounts of available information.
- Carefully determine the reliability of information sources.
- Interpret, organize and analyze information.
- Construct powerful means of communicating their findings, especially using technology
- Evaluate and reflect on the effectiveness of both their products and efficiency of the process.
- Make safe and ethical decisions while online. (17)

In the end, it may well come down to our knowledge of individual children, their special needs and the personal relationships with form with them that will be viewed as indispensable by parents, and therefore by administrators. In Neal Stephenson's novel *The Diamond Age* a youthful heroine is assisted through a very rough childhood by an e-book-like device titled *A Young Lady's Illustrated Primer*. This wonderful tool is a library and self-paced tutorial that offers her just the right skill, bit of information, or advice when needed. Although she didn't know it, her primer's power and usefulness were because the lessons were planned and monitored by a caring human mentor. The best schools will be the ones that provide the most human teaching; the poorer schools will increasingly rely on the economical technologies. (18)

And finally, we need to remain our schools' intellectual freedom-fighters - continuing our battles against the censorship of digital resources, advocating for patron privacy, and helping enforce copyright. We will need to have the expertise to advise students on the safe and ethical use of all information technologies. We will need to continue to be not just the brains of the school, but its soul as well.

In my darkest dystopian fantasies technology directors do the selection of not just library materials, but entire library programs. (19) If a commercial LIBRARIES-R-US can provide the resources and services virtually and

cheaply, what will keep a school from outsourcing? It's a question those of us who want to continue working in the public sector need to answer soon.

There will not be a guaranteed place for librarians in tomorrow's schools. Our profession will once again need to build and define its own role as the needs of our patrons and schools change, as our technologies mature, and as the definition of education itself is transformed. But we've done it before and we will do so again, *if* we look upon the change as opportunity and with the excitement and optimism I have about getting my first real e-book.

Sources:

1. In his book, *In the Age of the Spiritual Machine* (), author Ray Kurzweil makes a compelling argument that Moore's Law – that computing power will double every 18 months - will not only continue but accelerate exponentially well into the foreseeable future.
2. Fully functional notebook computers can now be found that weigh less than 3 pounds.
3. Calculators have used this technology for some years.
4. Both Wi-Fi (802.11) and Bluetooth are rapidly becoming standard on most portable computing devices.
5. Brainium's W-Book <www.brainium.com> uses only static memory. Floppy disks are rapidly being replaced by flash drives as a means of transporting computer files physically. One company developing a "digital paper is PARC Research <www.parc.com/research/dhl/projects/paperdisplays/>.
6. Many tablet computers already have this feature.
7. Google <google.com> now translates webpages into over 100 languages, including Elmer Fudd.
8. Download best sellers into your iPod today at audible.com <audible.com>.
9. Today's most highly rated video games are plot-driven. *Metal Gear Solid: the Twin Snakes* is an example, according to my gamer son.
10. Think graphic calculator prices and cell phones give-a-ways.
11. Computer use logs and e-mail monitoring systems, such as Symantec's Mail-Gear are common in schools.
12. Bookstores, public libraries and some high school libraries are adding coffee shops and paying great attention to the décor and comfort of their spaces.
13. A frightful quote was given in the Pew study "Digital Disconnect" by a middle school student: "The Internet is like a librarian without the bad attitude or breath." "The Digital Disconnect: The widening gap between Internet-savvy students and their schools." 8/14/2002 <www.pewinternet.org>
14. Currently, libraries select full-text periodical databases comprised of dozens of titles, rather than individual periodical titles. Streaming video services like United Streaming offer collections of educational titles. E-texts, while available for individual purchase (at eBooks.com for example), are as likely to be offered as ready-built collection such as Questia and the International Children's Digital Library.
15. Minnesota's ELM project <www.elm4you.org> is an example of a state-wide purchase of electronic resources. ELM includes netLibrary's collection of 13,000+ ebooks.
16. I am fascinated by the primitive "consumer advisory" services now provided by services such as Amazon and NetFlix that use past acquisition patterns to recommend other materials one is likely to like. The University of Minnesota's Assignment Calculator <www.lib.umn.edu/help/calculator/> provides a personal research tutorial service.
17. The Big6 <big6.com> information literacy process is widely used and its adoption is growing.
18. This was predicted as early as the mid 1980's.
19. The James J. Hill is the de facto library for scores of small and midsize businesses, offering a range of fee-based services. Several popular search engines currently offer fee-based searching. Nexus/Lexis and other legal databases have decimated most law firm libraries. Schools are outsourcing school lunch programs, technology services, and transportation. Are libraries next?

Letter from the Flat World Library Corporation

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A couple years ago, Linda, the Left Overshoe Middle School SLMS, read Thomas Friedman's book *The World Is Flat: A Brief History of the Twenty-first Century* (Farrar, 2005). She felt sorry for the legal researchers, medical technicians, and technology support personnel whose jobs were being outsourced to countries like India and China.

When Robert, the high school SLMS, learned that a local business had closed its library and contracted its research to a private research firm, he thought it made good business sense.

Louise noticed an increasingly larger percent of her elementary budget was going to electronic resources, most of which were "packages" tied to her state's standards. Her teachers didn't seem to need as much help finding support materials for their units. She was glad to have the extra time.

All the SLMs in the Left Overshoe schools encouraged their students to use a 24/7 electronic reference service, similar to AskUsNow <www.askusnow.info/about/> because it worked so well with the district's one-to-one computer to student laptop initiative.

But Linda, Robert and Louise met frantically one afternoon after school at the local pub to discuss a photocopy of a letter each of them received, along with a note from the superintendent. It read:



Flat World Library Corporation

March 15, 2007

Superintendent Dennis Hookworm
Left Overshoe Public Schools
Left Overshoe, MN 56034

Dear Superintendent Hookworm:

We at the Flat World Library Corporation can offer you a complete library program at a *very* attractive price.

For considerably less than you currently pay for your K-12 library program, we can provide a full range of library resources AND library services – all on line.

For only pennies a day per student, FWLC will:

1. Provide a full range of reading materials (periodicals, picture books, fiction and non-fiction titles), videos and reference sources that are tailored to your state standards, your district's curriculum and your digital textbook series. These resources are being constantly updated, and are available, of course, in a wide range of lexile ranges to support your differentiated instruction efforts. You can specify the level of community tolerance for issues ranging from abortion to gay rights to evolution from "university community" to "small town Kansas."
2. Provide ready reference services, student research help, readers' advisory service, and curricular planning advice through our real-time connections (video, chat or e-mail) to our experts in Bangalore, India. These highly-qualified MLS certified professionals will be available 24/7 to both your staff and students from school *or* home. (Do you get 24/7 service from your current library staff?)
3. Allow teachers to submit student work for comment and assessment. Our staff will give each project a consistent grade, check for plagiarism, and provide a report for each child that teachers can share with parents about the research and technology skill strengths and weaknesses of every individual student. We can even help your teachers design assignments and assessments, so they are free to lecture.

Just think of the advantages:

- No musty books from the 1950's cluttering your library shelves. No more lost or missing books.
- No library facilities. Turn that old library space into those badly needed special education classrooms.
- No more pesky librarians who want more money for materials, support staff, and staff development. Our highly skilled Indian librarians are happy to have their \$5 per hour jobs!
- A single, semi-competent technician in your district can maintain your entire library program.
- You can justify your district's expensive 1:1 computer/student initiative.
- No more contentious book or curriculum "challenges."

Please read the attached study (scientifically-based and conducted by FWLC's very own research department) that empirically demonstrates that this product can dramatically improve student performance where it counts - on high stakes tests. (FWLC has been approved by for Federal Title and grant funding – unlike traditional library materials and librarians.)

Act today!

Coming soon – special pricing for regional and statewide purchases.

Sincerely,
Bill Baudrate, CEO
Flat World Library Corporation
1-800-NO-BOOKS

The penciled note at the bottom from the superintendent read simply: "Why should I *not* buy this product?"

Schools for the Net Generation

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Oblinger and Oblinger, *Educating the Net Generation*, EDUCAUSE, 2005
www.educause.edu/educatingthenetgen

Pew Internet & American Life Project (various reports) www.pewinternet.org/

Tech-savvy students stuck in text-dominated schools, education evolving, 2005
www.educationevolving.org/studentvoices/student_opinion_papers.asp

Attributes	Implications for schools
<p>As a distinct demographic</p> <ol style="list-style-type: none"> 1. Born 1982-2000 - AKA Millenials 2. 36% of population/31% minority 3. Racially and ethnically diverse (20% have one immigrant parent) 4. Eventually larger group than Boomers 5. Valued (Play dates, NCLB, SAT prep) and Sheltered (Helmets, Metal Detectors, V-Chips and NetNanny) 	
<p>Relationship with Technology</p> <ol style="list-style-type: none"> 1. Fascinated by new technologies 2. Grown up with tech - immersed 3. 96% have gone online 4. Spend more time with digital media than TV (3.1 hours vs 3.5 hours) 5. Access primarily through home and amount varies by race and economic level 	
<p>Relationship with Information</p> <ol style="list-style-type: none"> 1. Ubiquitous - mobile 2. 94% have use the web for school research 3. Taggers/folksonomy users 4. Satisfice - snip-its 5. Information = conversation = authority? 	
<p>Learning Styles</p> <ol style="list-style-type: none"> 1. Teachers are vital - computers can't replace humans 2. Building social skills is a part of school 3. Social learners / informal learners 4. Re-mixers - Share - 57% content creators 5. Minds shaped by technology and media <p>Hypertext minds Read visual images Inductive discovery (games?) Learn by doing Shift attention Expect fast responses Text literacy less well developed Tech understanding shallow</p>	
<p>Values and Views</p> <ol style="list-style-type: none"> 1. Achievement oriented - Want rules, schedules and agendas - Believe it is cool to be smart - Focused on grades 2. Work on "things that matter" 3. Identify with parents' values 4. Busy with extra curricular activities 5. Unaware of consequences of their tech use 	

Libraries for the “Net Generation”

My son Brady is different – and I mean that in only the nicest way. Born in 1986, he has never lived in a home without a computer, began creating hyperstacks that sang and danced when he was five, and had access to the Internet starting in elementary school. The computer to him is about as remarkable as indoor plumbing is to me. He is constantly “connected” via iPod, cell phone, keyboard, digital videocamera, or game controller to the very technologies I too often find intrusive and puzzling.

Educators Diana and James Oblinger report similar observations about their own school-age children in the first chapter of the online book *Educating the Net Generation*, EDUCAUSE, 2005 (a free download from <www.educause.edu>). Just what is it with these always connected, multi-tasking, digitally oriented kids, born between 1982 and 1991, now being commonly called the “Net Generation?” they ask.

The second chapter of the Oblingers’ book sets out to answer that question by summarizing the findings of thirty-some studies about the characteristics of this demographic – especially in terms of how they learn and how they relate to technology. It’s an interesting and important read for all educators, but especially library media specialists.

Some of the findings are not terribly surprising. 96% of Net Genners have gone online and 94% have used the web for research. They see technology as “embedded in society,” a primary means of connection with friends, and helpful in solving both personal and academic problems. They spend more time using digital media than watching television. They seem more comfortable and adept with the newest technologies than the adults who surround them. These kids expect fast communication responses, tune out when things aren’t interesting, and may be more visually than verbally literate. For them, technology is a tool for learning on any topic they choose. (Are you reading anything you don’t already know from the media or from personal observation?)

But what caught my eye was that the studies also showed another side of this group, one far less publicly acknowledged. Our current crop of students believes that “teachers are vital,” that “computers can’t replace humans,” and that motivation is critical in learning. They like group activities, believing building social skills is a part of schooling; they identify with their parents’ values; and they are achievement oriented, feeling it is “cool to be smart.” And while fascinated with new technologies, their knowledge of them is often “shallow.” (Who actually *maintains* the computers in your home or school?)

And finally the studies point to how this generation learns – or likes to learn. Our current crop of students with their hypertext minds like inductive discovery rather than being told what they should know. In other words they want to learn by doing rather than simply listening or reading. They enjoy working in teams, on “things that matter,” often informally, and not just during school hours. And given their quick response requirements, they need to be encouraged to reflect.

Now it is my firm belief that schools will be more productive if educators acknowledge the unique attributes and preferences of the Net Generation and adapt educational environments to suit students instead of trying to change their basic natures. So what are some implications for NG (Net Generation) library media centers?

To a large degree, media centers may be the most NG-oriented places in schools. Our information resources and access to it continue to move from print to digital and the Net Generation is responding. *L&L*’s first “Media Matters” column “What Should Be on a School Library Web Page?” (Baumbach, Brewer, and Renfroe, September 2004) dealt with this shift in detail. General categories of information resources that should be on the “virtual” media center’s website included:

- online catalogs for not only your school LMC but also other libraries your students might use
- reference resources and assistance
- curriculum connections
- literacy connections
- general information about your LMC

It's a given that Net Genners are drawn to digital resources and we need to provide them, but there are two other areas that deserve attention if we are to meet all the needs of today's kids.

NG Physical Facilities

Although many students today are connected virtually using cell phones, IM, and e-mail, they still congregate at local coffee shops, malls and movie theaters. Online presence has not replaced physical presence in these kids' lives. Does this mean the media center as a "room" in the school is still important to the Net Genners, and just what will keep it relevant to them?

Given their preference to work in groups, the Net Generation media center (NGMC) provides spaces for collaboration on school projects and socialization. It contains the tools necessary for the production of information, not just its consumption – computers with the processing power and software to edit digital movies and photographs, scanners, and high quality printers and projection devices - and of course, assistance in the use of these tools. Networking hardware and those employees who maintain it also need a home and the NGMC provides it since most have a central location in the building and secure spaces. It's hub of the school, not just philosophically, but physically.

And taking a lesson from today's bookstores, the NGMC provides spaces where kids and teachers *want* to be. The NCMC has comfy chairs, a friendly atmosphere, low-stress, safe, and forgiving – and yes, in high schools, an in-house coffee shop. Spaces for story times, puppetry, plays, and games along with computer stations with age appropriate software and easily found elementary websites are just as important in elementary schools. If the "room" is not a wonderful place to be, students *and* teachers will stay on the Internet or in the classroom. Period. (And given the rise in online schools, is there a lesson here for classrooms as well?)

In creating what is commonly being referred to as the "hybrid library," we can't ignore either the electronic *or* physical resources we offer students.

Net Generation Media Specialists (NGMS)

Both the addition of new technology resources and the continuous changes in existing ones makes locating and using information increasingly challenging. The media specialist's role as "information expert" for students is more important than ever. Helping Net Genners select the right search tool, build effective search strategies, and determine the relevance of found information is a primary job of the NG media specialist. Helping students take the time to analyze the quality of the information despite their desire for rapid responses and reluctance to reflect is even more important.

In the second "Media Matters" column, "Substantive Searching: Thinking and Behaving Info-Fluently" (*L&L*, November 2004), Joyce Valenza explores the complexities both the attitudes and behaviors of effective searchers including:

- Knowing what he or she is looking for
- Realizing he or she has search choices
- Knowing basic strategies for evaluating sources
- Knowing that advanced search screens exist and offer greater searching power

- Knowing when quality matters
- Having a plan
- Having mind tools for organizing materials he or she gathers as well as tools for designing the product
- Recognizing when he or she might benefit from consulting an information professional

Our Net Genners may be adept at pushing buttons, but the NGMS teaches them to be purposeful and effective while doing so.

Unfortunately, I've known media specialists whose primary goal is to *reduce* the number of students using their media center. The availability of online resources makes accomplishing such a goal quite achievable. But unused media programs don't require staffing. The NGMS who truly serves today's students works on interpersonal skills as well as technical skills and designs programs that recognize and honor their NG learning preferences. The findings of the Oblingers' book suggest ways to increase our value to students:

1. An inductive style of learning

The NGMS's work with students on problem-based research assignments is a natural fit for this preferred style of learning. Helping kids learn how to learn by finding information, and putting it to use is the antithesis of the "rote, restraint, regurgitation" methodology that is the mainstay of too many classrooms. An increased emphasis on primary sources – original surveys, interviews, experiments and source documents – gives students a chance to use even more of their inductive skills. And using technology to both find and present information is very much an active, hands-on, applied experience.

2. Information presented visually rather than textually

The acquisition and promotion of both picture books for younger students and graphic novels for older ones is a given in NG media centers. And while the current generation of educators may learn best verbally and do (rightfully) value print resources, the NGMS provides information in a wide variety of formats including both analog and digital video, pictorial and aural resources, and the technologies through which such resources can be viewed or heard. The NGMS also recognizes that this generation of Ken Burns-wannabees enjoys communicating visually as well. NGMS helps teach students how to take and edit digital photographs, create digital movies, create multimedia presentations, and serves as the visual literacy experts in our schools, teaching students how to critically examine visual information.

3. Meaningful learning experiences

For many students, research of primarily academic interest (literary criticism, historical research, non-applied science investigation) is seen as irrelevant and unimportant. But it is not just academically oriented kids who need good information and problem-solving skills – all learners need these skills to meet both vocational and personal needs. The media program and its resources have long been a resource for students seeking information for personal, day-to-day needs. The same student reluctant to research an aspect of the Civil War willingly practices information problem-solving skills to figure out the best video game to buy. The NGMS finds ways to combine academic assignments and personal interests to reach all students. A student who is interested in hunting may get excited about comparing the firearms used by the North and South in the Civil War *if* guided by a skillful NGMS, hopefully in collaboration with the classroom teacher.

4. Work in groups

The NGMS fosters student collaboration both online and in the media center. The days of the shushing librarian are over. While the NGMS still works to maintain a physical environment that is conducive to learning, s/he recognizes that conversations are the stuff of genuine involvement and provides the tables, conference rooms

and labs where those conversations can take place. The NGMS helps make available and teaches students to use collaborative tools such as wikis, discussion groups, and blogs.

5. Need for rapid results

By working both in the virtual and physical world, the NGMS helps meet today's students' "any-time learning" needs. Net Genners tend to be impatient and want to be able to learn outside of school. The NGMS is, of course, available during schools hours and can help students with questions then, but s/he can do "virtual" reference as well by providing her/his e-mail addresses and responding to questions electronically (perhaps with a disclaimer about an approximate turn around time). The NGMS facilitates timely interlibrary loan of information contained only in physical formats (and teaches the skills needed to access the library collections that contain them).

6. A welcoming and safe environment

Not all students are comfortable in our classrooms and hallways. Bored in classes, intimidated in common areas, these kids need a place where they are welcome, safe and valued. The NGMS above all else creates a program that serves students who are diverse – economically, culturally, and academically.

A frightful quote was given in a Pew study by a middle school student: "The Internet is like a librarian without the bad attitude or breath." ("The Digital Disconnect: The widening gap between Internet-savvy students and their schools," 2002. <www.pewinternet.org/report_display.asp?r=67>) But if the NGMS provides resources, facilities and learning opportunities that are uniquely suited to the Net Generation and has a genuine appreciation for their unique attributes and talents, s/he will be valued in return by this "next greatest" generation. And this in turn is a good thing for the profession as these students become parents, teachers, school board members, and legislators themselves,

Skills for the Knowledge Worker

Building Conceptual Age Skills – What Should Schools Be Doing?

Daniel Pink’s book, *A Whole New Mind*, suggests some ‘Conceptual Age skills’ needed for workers in a world of Asia, Abundance and Automation. What experiences/activities should schools be offering students to help build these skills?

<p>1. Not just function, but also DESIGN. “It’s no longer sufficient to create a product, a service, an experience, or a lifestyle that’s merely functional. Today it’s economically crucial and personally rewarding to create something that is also beautiful, whimsical, or emotionally engaging.”</p>	
<p>2. Not just argument, but also STORY. “When our lives are brimming with information and data, it’s not enough to marshal an effective argument... The essence of persuasion, communication, and self-understanding has become the ability also to fashion a compelling story.”</p>	
<p>3. Not just focus, but also SYMPHONY. “What’s in greatest demand today isn’t analysis but synthesis – seeing the big picture and, crossing boundaries, being able to combine disparate pieces into an arresting new whole.”</p>	
<p>4. Not just logic, but also EMPATHY. “What will distinguish those who thrive will be their ability to understand what makes their fellow woman or man tick, to forge relationships, and to care for others.</p>	
<p>5. Not just seriousness, but also PLAY “Ample evidence points to the enormous health and professional benefits of laughter, lightheartedness, games and humor.”</p>	
<p>6. Not just accumulation, but also MEANING. “[Material plenty] has freed hundreds of millions of people from day-to-day struggles and liberated us to pursue more significant desires: purpose, transcendence, and spiritual fulfillment.”</p>	
<p>7. Not just knowledge, but also LEARNING. (Johnson) Unless a person develops both the ability and the desire to continue to learn new skills, to be open to new ideas, and to be ready to change practices in the face of new technologies, economic forces, and societal demands, he or she will not be able to successfully compete in a global economy.</p>	

Skills for the Knowledge Worker

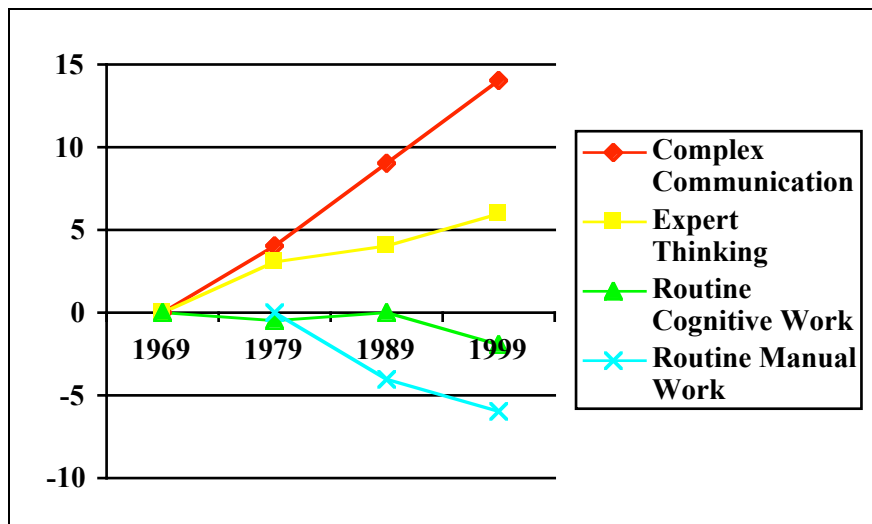
In early 2005, reporter Thomas L. Friedman frightened a great number of Americans with his book *The World Is Flat: A Brief History of the Twenty-first Century* (Farrar, 2005) by detailing the impact of globalization on the white-collar workforce in developed countries. Many U.S. jobs thought to require “knowledge economy” skills, and therefore secure, Friedman reported, are now being exported to nations like India and China that have good telecommunications infrastructures, an overabundance of skilled workers, and, compared to the U.S., a very low wage scale.

Most Americans, especially those in traditional blue-collar jobs such as manufacturing, have for decades watched non-skilled work being shifted to either automated systems (robotics) or to cheaper foreign labor markets. The conventional wisdom has been that in order to be a productive worker in the post-industrial economy one needed an educated mind rather than a strong back for work that would be done sitting at desk, not standing on the factory floor.

But Friedman reports that “desk” jobs in the fields of customer/technical support, computer programming, medical technician diagnostics, tax preparation, and legal research are now migrating abroad as well. The outsourcing of these kinds of jobs should cause educators to seriously examine what constitutes “knowledge worker skills.” How might prepare our graduates to function in jobs that can’t be outsourced--and in some way justify the high remuneration that middle class workers have come to enjoy in developed nations?

This is a problem that is being overstated in the short run, but understated in the long run. At the current time one in ten technical support skills are off-shored; by 2010, it will be one in four such jobs. (Morello, "U.S. Offshore Outsourcing: Structural Changes, Big Impact," Gartner, July 15, 2003.) Business analysts predict: “The offshore trend is not a fad, but a mega-trend.” (Kalakota and Robinson, “Offshore Outsourcing: Will Your Job Disappear in 2004?” Informit.com, Feb 27, 2004.)

Is the educational establishment addressing this trend? The article “Education and the Changing Job Market” (Levy and Murnane, *Educational Leadership*, October 2004) contains this remarkable graph titled “Trends in Tasks Done by the US Workforce 1969-1998 (1969 = 0)”



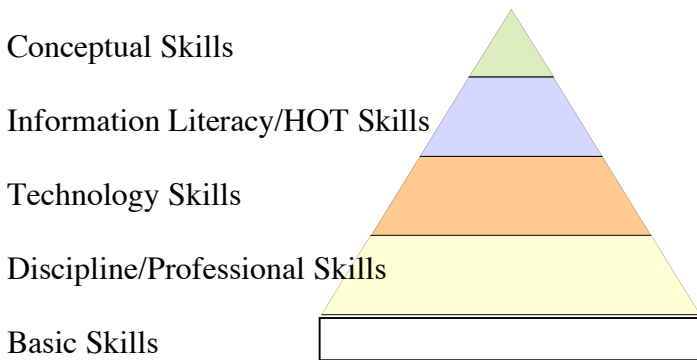
In the article, the authors raise questions about whether current standards-based public education prepares students for mastery of the occupations set to grow in the United States. Using U. S. Bureau of Labor Statistics

data they argue that the greatest job growth will be in well-paying occupations requiring “expert thinking” and “complex human communication.” Schools, the authors claim, need to teach in such a way that these skills become second-nature to high school graduates, and graduates can apply these skills in college or postsecondary training programs, which lead to success in up-and-coming occupational fields.

But what exactly do we mean when we say “expert thinking” and “complex human communications?” What separates these job skills from “routine cognitive” work? And are there skill sets which students must master before being able to considered complex communicators or expert thinkers?

Johnson’s Hierarchy of “Knowledge Worker Skills”

I would posit that there is a Maslovian-type Hierarchy of Knowledge Worker Skills, skills that need be mastered prior to the acquisition and application of “higher order” skills. I will categorize these as: Basic Skills, Discipline/Profession Specific Skills, Technology Skills, Information Problem-Solving/HOT Skills, and Conceptual Skills. Each is described below.



Level One: The Basics Skills

The ability to read for understanding, interpret visual information, write comprehensibly and persuasively, and solve numeric problems are, and will remain, the foundations on which all other “knowledge work” skills rest. To this end, the United States has ambitiously devised systems of testing to help assure that all students have these literacies. Much of this testing, which varies by state, tests only basic reading comprehension, simple composition and low-level arithmetic skills.

The danger many educators perceive in an emphasis on “the basics” is that if only the basics are tested (and thereby valued), schools will ignore the affective, creative, and problem-solving sides of education and give student few chances to apply these skills in meaningful ways. Basic skills, in other words, are an important bar to set for students, but an exceeding low one. Yet, as a primary, if not sole measure of school effectiveness, school leaders are establishing goals and improvement plans addressing student performance on very basic “basic” skills.

Level Two: Discipline/Profession Specific Skills

K-12 schools have the obligation that all students gain some degree of what is often referred to as “cultural literacy.” This is a base of knowledge in history, social science, science, literature, and both physical and cultural geography. These will not be acquired without mastery of the basic skills listed above, and what

constitutes “cultural literacy” is highly debatable. The memorization of massive numbers of facts without context or application has been rightly criticized as not being a valuable end-product of education.

Post-secondary schools teaching the core skill sets and body of knowledge of science, law, education, architecture, medicine, computer science, engineering, accounting, and other professions will continue to be important, of course. Yet these occupations are evolving as technology automates routine tasks and creates new procedures and processes (computer modeling in engineering and CAT scans in medicine) that are impossible to do without technology.

Level Three: Technology Skills

Since technology has impacted nearly every job that might be considered “knowledge work,” there is an increased recognition that basic technology skills have become a new “basic skill.” The International Society for Technology in Education (ISTE) attempts to describe what students need to know and be able to do in its “National Educational Technology Standards”(1998) <cnets.iste.org>. These standards are divided into six broad categories of application:

Technology Foundation Standards for Students

1. Basic operations and concepts
 - Students demonstrate a sound understanding of the nature and operation of technology systems.
 - Students are proficient in the use of technology.
2. Social, ethical, and human issues
 - Students understand the ethical, cultural, and societal issues related to technology.
 - Students practice responsible use of technology systems, information, and software.
 - Students develop positive attitudes toward technology uses that support lifelong learning, collaboration, personal pursuits, and productivity.
3. Technology productivity tools
 - Students use technology tools to enhance learning, increase productivity, and promote creativity.
 - Students use productivity tools to collaborate in constructing technology-enhanced models, prepare publications, and produce other creative works.
4. Technology communications tools
 - Students use telecommunications to collaborate, publish, and interact with peers, experts, and other audiences.
 - Students use a variety of media and formats to communicate information and ideas effectively to multiple audiences.
5. Technology research tools
 - Students use technology to locate, evaluate, and collect information from a variety of sources.
 - Students use technology tools to process data and report results.
 - Students evaluate and select new information resources and technological innovations based on the appropriateness for specific tasks.
6. Technology problem-solving and decision-making tools
 - Students use technology resources for solving problems and making informed decisions.
 - Students employ technology in the development of strategies for solving problems in the real world.

The focus of these clear and well-written standards is on the *use of the technology itself*. And while technology is sufficiently novel, difficult, and mystifying, special standards like these will be necessary. (Note: these standards were revised in 2007. See ISTE website for most current version.)

But technology gurus like Donald Norman are beginning to see that the “how to use technology” skills are becoming less important. In his book *The Invisible Computer* (MIT Press, 1999), Norman argues that no one really wants to use a computer or even use a word processor. What one really wants to do is write a letter. He predicts that “information appliances” will do a single task simply with minimal technical expertise on the part of the user. Just think how little training is associated with using an AlphaSmart (a portable, inexpensive word processing device) compared to using Microsoft *Word*. And for most beginning writers, the AlphaSmart does 90% of the drafting and editing that can be done with *Word*.

Level Four: Information Problem-Solving Skills and Higher Order Thinking Skills

While the ISTE standards focus on the technology itself, “Information Literacy Standards for Student Learning” (1998) <www.ala.org/aasl/ip_nine.html> acknowledges technology as one of broader set of skills needed by students to be successful information problem-solvers. Released as part of the American Association of School Librarians (AASL) and Association for Educational Communications and Technology’s (AECT) guidelines, *Information Power: Building Partnerships for Student Learning*, these standards have three major divisions of nine standards:

1. Information Literacy

Standard 1 The student who is information literate accesses information efficiently and effectively.

Standard 2 The student who is information literate evaluates information critically and competently.

Standard 3 The student who is information literate uses information accurately and creatively.

2. Independent Learning

Standard 4 The student who is an independent learner is information literate and pursues information related to personal interests.

Standard 5 The student who is an independent learner is information literate and appreciates literature and other creative expressions of information.

Standard 6 The student who is an independent learner is information literate and strives for excellence in information seeking and knowledge generation.

3. Social Responsibility

Standard 7 The student who contributes positively to the learning community and to society is information literate and recognizes the importance of information to a democratic society.

Standard 8 The student who contributes positively to the learning community and to society is information literate and practices ethical behavior

Standard 9 The student who contributes positively to the learning community and to society is information literate and participates effectively in groups to pursue and generate information.

(Note: these standards were revised in 2007. See AASL website for most current version.) Yet even these standards say little about how information once found and evaluated is to be purposefully used.

There is an acknowledgement that students need Higher Order Thinking Skills (HOTS), of which Benjamin Bloom’s Taxonomy is among the most venerated. Bloom identifies six levels within the cognitive domain, with certain verbs often listed in association with each level.

1. Knowledge: memorize, name, recognize, repeat, recall, define

2. Comprehension: describe, discuss, explain, restate, translate

3. Application: apply, demonstrate, illustrate, interpret

4. Analysis: analyze, categorize, compare, contrast, distinguish

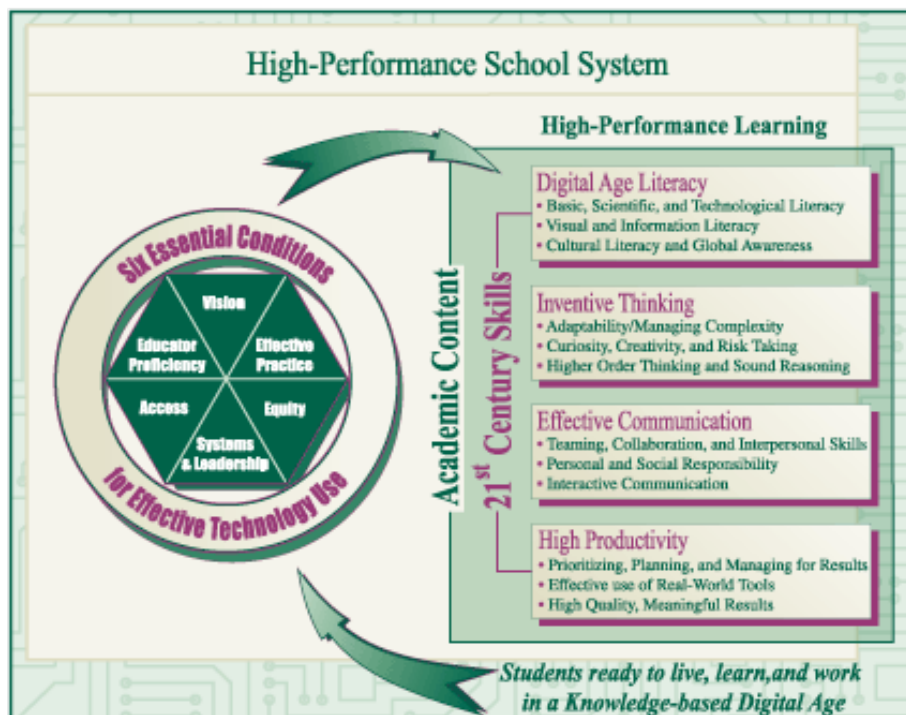
5. Synthesis: arrange, create, develop, design, formulate

6. Evaluation: assess, defend estimate, judge, predict, rate, support (PBS Teacher Source, <www.pbs.org/teachersource/whats_new/math/assessment0300.shtm>)

Another interesting look at developing higher order thinking skills (that bridges this category of skill and the next – “conceptual” skills – are *The Habits of Mind* <www.habits-of-mind.net/>. Costa and Kallick believe good problem-solvers demonstrate these characteristics:

1. Persisting
2. Thinking and communicating with clarity and precision
3. Managing impulsivity
4. Gathering data through all senses
5. Listening with understanding and empathy
6. Creating, imagining, innovating
7. Thinking flexibly
8. Responding with wonderment and awe
9. Thinking about thinking (metacognition)
10. Taking responsible risks
11. Striving for accuracy
12. Finding humor
13. Questioning and posing problems
14. Thinking interdependently
15. Applying past knowledge to new situations
16. Remaining open to continuous learning

One effort that is attempting to define a more holistic approach to technology, information literacy and HOTS is NCREL’s “eGauge 21st Century Skills” <www.ncrel.org/engage/skills/skills.htm>. This interesting model is definitely worth a look, but in my opinion, still may not address all the skills a post-information age worker needs.



Level Five: Conceptual Skills

Daniel Pink's book, *A Whole New Mind: Moving from the Information Age to the Conceptual Age* (Riverhead Books, 2005) acknowledges Asia (the outsourcing trend described by Friedman), as well as two other trends impacting on an individual's value in the labor market which he labels "Abundance" (rising affluence which leads to markets of not just functional, but pleasing goods and services) and "Automation" (improvements in mechanized and AI labor). He suggests that readers ask themselves three questions about their jobs:

1. Can someone overseas do it cheaper?
2. Can a computer do it faster?
3. Am I offering something that satisfies the nonmaterial, transcendent desires of an abundant age? (Are you not just manufacturing toilet brushes, but toilet brushes that satisfy the user's aesthetic sensibilities as well?)

As a result of these trends, he believes we are shifting from the Information Age to the Conceptual Age. Successful players in this new economy will be required to develop and use the right-brain abilities of high concept (seeing the larger picture, synthesizing information) and high touch (being empathetic, creating meaning). Happy news, perhaps, for those of us who never were all that good at the left-brain stuff in the first place.

More specifically, he suggests we work toward developing in ourselves (and I hope by implication, our students), six right brain "senses," to complement our left-brain, analytic skills. He suggests we need realize the value of:

8. **Not just function, but also DESIGN.** "It's no longer sufficient to create a product, a service, an experience, or a lifestyle that's merely functional. Today it's economically crucial and personally rewarding to create something that is also beautiful, whimsical, or emotionally engaging."
9. **Not just argument, but also STORY.** "When our lives are brimming with information and data, it's not enough to marshal an effective argument... The essence of persuasion, communication, and self-understanding has become the ability also to fashion a compelling story."
10. **Not just focus, but also SYMPHONY.** "What's in greatest demand today isn't analysis but synthesis – seeing the big picture and, crossing boundaries, being able to combine disparate pieces into an arresting new whole."
11. **Not just logic, but also EMPATHY.** "What will distinguish those who thrive will be their ability to understand what makes their fellow woman or man tick, to forge relationships, and to care for others."
12. **Not just seriousness, but also PLAY** ("Ample evidence points to the enormous health and professional benefits of laughter, lightheartedness, games and humor.")
13. **Not just accumulation, but also MEANING.** "[Material plenty] has freed hundreds of millions of people from day-to-day struggles and liberated us to pursue more significant desires: purpose, transcendence, and spiritual fulfillment."

I will also be bold enough to add a seventh "sense" of my own to Mr. Pink's list:

14. **Not just knowledge, but also LEARNING.** Unless a person develops both the ability and the desire to continue to learn new skills, to be open to new ideas, and to be ready to change practices in the face of new technologies, economic forces, and societal demands, he or she will not be able to successfully compete in a global economy.

In the age of educational accountability, we seem to be gearing all our instructional efforts to helping students master left-brain skills, since that is what tests usually measure. But to what extent do we and should we also be

developing design sense, storytelling abilities, the ability to synthesis information, empathy, the use of humor, and the ability to detect the importance of the information learned? How do we create true “life-long learners?”

What emphases, using Pink’s model, might schools and libraries wish to cultivate in the “conceptual age” worker?

1. DESIGN

- Offer art classes and activities
- Assess not just content, but appearance of student work
- Teach visual literacy

2. STORY

- Ask for student writing in the narrative voice.
- Teach speaking skills.
- Use storytelling as a part of teaching.
- Give students opportunities to both hear and tell stories.

3. SYMPHONY

- Design classroom projects that cross disciplines.
- Ask for the application of skills and concepts to genuine problems.
- Use inductive learning strategies (learning by doing).

4. EMPATHY

- Emphasize reading literature about people from other cultures and socio-economic groups.
- Give students service learning and volunteer opportunities or requirements.
- Give students the opportunity to take part as an actor in theater productions.
- Design group projects.

5. PLAY

- Teach with games.
- Offer a variety of athletics and physical education classes.
- Offer participatory music classes.
- Teach through riddles and jokes, and encourage students to tell them.

6. MEANING

- Offer classes in comparative religion, myth and legend.
- Teach ethical behaviors as a part of every project.
- Asking for writings to include statements of personal values.

7. LEARNING

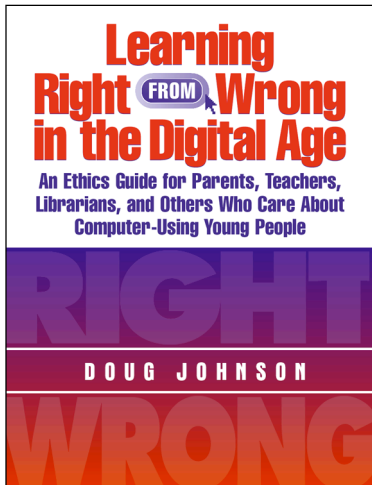
- Teach processes, not facts.
- Allow students to research areas of personal interest (and tolerate a diversity of interests).
- Give students the ability to learn in non-traditional ways (online, early enrollment in college, apprenticeships).
- Make available clubs and organizations for students to join in which students learn non-academic skills.
- Provide access to a wide range of information sources.

Our society and educational system sadly sees many of the opportunities listed above which develop “conceptual age” skills as “extras” – frills that are often the first to be cut in times of tight budgets. We are doing a disservice to our students as future workers and citizens by doing so.

Conclusion

I admit that I approach the problems of creating “knowledge worker” skills both from a U.S.-centric and pragmatic point of view. Yet conscientious librarians and educators of every country and professional role should be advocating for more attention to be paid to the questions: What skills will give individuals value in a global economy? What skills will allow my students to achieve the greatest level of professional attainment and personal fulfillment? What projects, activities, and assessments will allow students to practice these skills? What do schools and library programs look like that help their students and patrons master these skills?

As librarians we need to provide access to the resources necessary to support technology, information literacy and high-order thinking skills. As teachers, we need to model instructional design and delivery practices that build “conceptual age” skills. And as school leaders, we need to advocate for instructional programs that go beyond “the basics” if we are to truly demonstrate concern for our students’ futures.



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