



"Now, educators face the second decade of the 21st Century with seemingly unlimited ways technology can influence what we do."

Achieving Teaching and Learning Excellence With Technology

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Since the very first introduction of a Commodore Pet, TRS 80, and the Apple II microcomputers beginning in 1977, billions of dollars have been spent chasing a dream about the effect of technology on teaching and learning.

Some thirty years later, the exponential development of powerful devices, networks, the Internet, software, and now Web 2.0 keeps the effect dream alive, but the results somewhat elusive.

By 1977, teacher-librarians and audiovisual specialists were busily integrating various multimedia into school libraries and audiovisual collections. Few people could imagine at the time or embrace the seemingly outlandish claims for devices doing work within a whopping 48K or the gigantic 64K machines.

Now, educators face the second decade of the 21st Century with seemingly unlimited ways technology can influence what we do. Simultaneously, children and teens of this generation have enthusiastically embraced technology for social networking and content creation purposes but have failed or not been allowed to extend their technology expertise over into their academic pursuits.

DOES TECHNOLOGY MAKE A DIFFERENCE?

There are a litany of reasons from research and the professional literature detailing reasons why technology does not fulfill the often bloated expectations, but we would like to focus on some observations of our own.

For decades, a popular approach to technology is what we would refer to as device driven applications. When a new technological device hits the market, we begin by trying to discover its characteristics and then imagine how those characteristics could be used in teaching and learning. The same goes for software and in particular Web 2.0 apps. Here is an application, here is what it does, and here are some ideas of how it could be used. All of us respond to lists of apps or smackdowns whereas we are entertained and dazzled by endless gizmos, a new tool or toy, and neat new discoveries.

Such sessions, while fun and exciting, often leave one with an overwhelming feeling of confusion and inadequacy. What should I buy? What 25 apps should I investigate next? How do I keep track of what does what?

THE LEARNING TO TECHNOLOGY APPROACH

The authors and contributors of this article set out in the opposite direction. We call it the learning to technology approach. Begin with a learning problem, diagnose that

problem, and then prescribe one or several excellent tools that will work to solve that "problem." We could also say begin with best practices you want to achieve and then fit the tool to that challenge. Become the doctor, not the pharmacist.

In our lists we grouped the many characteristics of both devices and software into six major categories, followed by a focus on the organization to deliver those teaching and learning benefits. Our argument for this arrangement centers on excellence in teaching and learning—the idea that technology use must be tested for both individual and group growth in a global world. Thus, we end the listings under each characteristic with encouragement to collect data on that characteristic and report it widely. We give the major reason for this in our conclusion: Actual data and evidence collection is beyond the scope of this article. There are sources that will help in that focus, so first focus on results and then develop techniques to measure effect.

We are quite certain every reader will be able to add both items under each characteristic as well as find examples that have produced results with real learners in their schools. Perhaps this list can be the foundation of a major conversation in professional learning communities and in technology-focused professional development. Here is the list:

EFFICIENCY (STUDENTS AND ADULTS WORK TOGETHER SMARTER)

■ Both students and adults build organizational skills to handle the world of information and technology and turn it into a foundational tool to boost their learning. Examples:

- Shared calendars helped everyone meet deadlines.
- Group project roles, deadlines, and responsibilities led to more efficient collaboration.
- Individuals built their own information spaces that gave them power over the onslaught and juggernaut of the Internet.
- Communication across the room, the school, the community, and the world al-

lowed for projects of a larger scope.

- Writing and research were enhanced by tracking bibliographies, quotes, sources, note taking, and editing.

- Customized search engines that probed in-depth into information and documents provided better and more relevant searches.

- Gadgets, widgets, RSS feeds, and alerts connected learners automatically to needed content, news, blogs, and people.

- Collaborative construction of documents, presentations, and creative works were done in real time.

- Collaborative creation of works that could be tracked, monitored, edited, developed, and assessed by students and teachers over time had a direct effect on quality of thinking and sharing.

- Collaborative linking and sharing of resources brought a wider variety of information into the pool for various learners.

- Opportunities to deliver products that represented learning also reflected the students' learning style.

■ Technology assists provides everyone the opportunity to create professional-looking presentations, products, reports, videos, audio, and mashups.

- Technology assists benefit all learners whether they are gifted, challenged, or have varying learning styles.

- True differentiation to boost productivity becomes a reality with a variety of tech tools.

- Work time with many applications streamlines searching, building, and constructing so more time can be spent in thinking, reasoning, and sound decision-making as well as analysis, synthesis, and reflection.

- Student-centric technology allows customization and provides the ability to tailor learning to individual student needs.

Evidence of the effect of technology on efficiency is collected and reported widely.

MOTIVATION TO LEARN

■ Variety and novelty of a technology or a new technique piques attention, motivation, and engagement. Examples:

- A Geek squad of students taught the

entire school new technology in one week.

- A class was offered for 1/4 credit per year for students to tend the help desk, participate in training for computer repair, and provide a regularly published "Tips" newsletter for the school community. Previously "bored" students suddenly had a purpose in coming to school.

- A plethora of choices of devices, tools, and techniques facilitated wide choice in product creation.

■ Use of technology boosts engagement of a higher percentage of learners as compared to textbook lecture strategies. Examples:

- Social networking skills began to extend toward a new culture in academic skills.

- Using blabberize.com, elementary students were able to share information from their "animal reports" in a much more dynamic way.

■ Real problems and issues boost both engagement and deep understanding. Examples:

- Using a handy miniature video camera, students were excited to interview law enforcement personnel about a school disaster plan they were creating.

- Projects across borders brought a sense of community, sharing, and learning across cultures.

- Presentation tools encouraged students to reach out to adults in their communities and work to solve real-time problems.

■ Personalization of learning allows all learners to make choices, to take command of their own learning, and to capitalize on their personal strengths.

- Many tech tools allow experimentation and playing with ideas thus nurturing creativity and inviting innovation.

■ Presenting, performing, and sharing with peers stimulates the quality of products, work, and the desire to participate fully. Examples:

- Young children each created a "slide-show," which they presented to parents.

PICTURE BOOKS

YOUNG SCIENTISTS

Barnum Brown, dinosaur hunter.

David Sheldon. Walker, 2006. \$16.95. 978-0-8027-9602-8. Grades 2-3. A story of the exciting exploits of the explorer and scientist who discovered T. Rex and became the greatest dinosaur hunter of all time.

Just a school project. Mercer Mayer.

HarperCollins, 2004. \$3.99. 978-0-06-053946-7. Grades 1-3. Mayer's Little Critter returns to choose a topic for a science project they have to plan and put together. This purposeful but humorous episode will take fledgling readers step by step through a universal assignment, and doesn't leave out such common pitfalls as false starts.

A man for all seasons: The life of George Washington Carver. Stephen Krensky. Ill. Wil Clay. Collins, 2008.

\$16.99. 978-0-06-027885-4. Grades 2-4. This profile of the great scientist's career demonstrates how an enquiring mind and a deep desire to learn create a foundation for brilliant and groundbreaking insights into science and the natural world.

One beetle too many: The extraordinary adventures of Charles Darwin. Kathryn Lasky. Ill. Matthew Trueman.

Candlewick, 2009. \$17.99. 978-0-7636-1436-2. Grades 2-4. Deft and carefully detailed paintings bring this portrait of the renowned scientist to life, and add detail to Lasky's lively account of his travels, his discoveries, and his career.

Science fair day. Lynn Plourde. Ill.

Thor Wickstrom. Dutton, 2008. \$16.99. 978-0-525-47878-2. Grades 1-3. Young reporter Ima Kindanozee goes around asking questions about (and messing up) her classmates' science projects, but thanks to quick work from teacher, Mrs. Shepherd, everything's ready when the time for judging comes. A lively tale full of slapstick comedy and scientific detail.

- Presentations by individuals and groups were available for simultaneous sharing, analysis, synthesis, and assessment.

- Student presentations became more sophisticated using mash ups and a variety of technologies.

- Collaborative spaces extend beyond purely social concerns toward, constructing, sharing, and motivating others, and present opportunities to not only raise student interest in learning, but also allow them to grow from each other's insights. Examples:

- Many tools for forming reading networks, sharing spaces and encouraging, critical analysis promoted a high interest in reading, writing, and enjoyment of multiple genres in numerous small to large group environments. Such groups took on a life of their own.

- Collaborative spaces raised "students' level of concern" and encouraged them to collaborate when they could read thoughtful responses of their peers using their literature circle wikis.

Evidence of the effect of technology on motivation to learn is collected and reported widely.

DEEP UNDERSTANDING

- Certain tech tools allow for both individual and collective knowledge building in conjunction with the process skills that are being developed. Examples:

- A group of various non-native English speakers created varying pictorial representations to understand science and social studies concepts.

- Older students developed electronic resources for younger students and learned about child development at the same time.

- When content, substance, original and creative thinking, logic, and reflection are the focus of assessment over the admiration of glitzy and slick presentations, the focus of presentations and projects turns toward academics. Example:

- Students began to notice that adults were more interested in the content of their presentations rather than splashy tech fea-

tures. When one group got a higher grade for their presentation than did a special effects presentation with little substance, the word got around: Know your stuff!

- Real and authentic problems or issues combined with inventive uses of technology boost sustained interest, deep understanding, and engagement. Examples:

- A collaborative study of school violence and bullying utilizing many Web 2.0 tools expanded student interest in taking major action both in their school and across schools in their community.

- Lead teachers designed a Web 2.0 environment to facilitate the study of a Professional Learning Community. They modeled the building of deep understanding of professional concerns as they learned how to use the technique with their students.

- Live television coverage and web-streaming of school events allowed students to learn the production process and provided an opportunity to share their voice with the community.

- Web-based student publications—a school newspaper (or literary journal)—provided dynamic environments for student journalists and writers to hone their skills in a 24/7 environment while also learning about the editorial process and the importance of authority.

- Technology can change the way we engage with content and/or actually add to content. Example:

- The use of GPS technologies had an effect on how students saw the geographic and political world. One class proposed a novel two-state solution between Israel and the Palestinians, and sent their proposal to the parties involved.

- Deep understanding is stimulated by the delivery and interaction with resources via technology that can be done no other way. Example:

- Video of how a human heart actually works enhanced deep understanding along side two-dimensional diagrams, descriptions from the printed page, models of the heart, and data from various sensing technologies.

Evidence of the effect of technology on

deep understanding is collected and reported widely.

LEARNING HOW TO LEARN (21ST CENTURY SKILLS)

- Certain tech tools allow for building both individual and collective learning skills competence in conjunction with the content knowledge and deep understanding that are being developed. Example:

- Students used mind mapping tools such as Mindmeister, Giffy, bubble.us, and MyWebinspiration to build ideas about people, places, and issues as a small group; then they jigsawed to understand varying interpretations.

- Multiple literacies that involve new techniques and new methods of analysis evolve as new competencies are required for new tools and applications. Example:

- Adults noted that social networking required new participatory skill sets as Jenkins describes in *Confronting the Challenge of Participatory Culture: Media Education for the 21st Century* (2006). The adults focused on those skills across a semester measuring progress across time.

- Learning how to collaborate as a creative and skilled group member can be done across blogs, wikis, and back channels. Examples:

- Before doing their collaborative research, students, classroom teachers, and teacher-librarians used a Google Spreadsheet to create suggested rules about team responsibility during research. After brainstorming, the entire group looked at the suggestions on the spreadsheet as a whole and then built a common set for the project at hand. After the project, the class reflected on progress made in collaboration.

- When students worked collaboratively online and teachers were able to view the history of their documents, all participants of the collaboration became accountable for their contribution and students took ownership of their collaborative products.

- Finding quality information on the

Web and sorting through the voices of who is saying what to me for what reasons and for what gain is an essential life skill. Examples:

- Collaborative teams searched for and evaluated the credibility of web sites in order to defend their use in a joint project.

- Instruction about how to evaluate a student's product regarding the quality of information included was the theme of a professional development opportunity session with follow-up three months later.

- Learning the research process and other information literacy skills is a part of building content knowledge. Examples:

- Students used tech assists to help in the research process including search engines, note taking, attribution, analysis, synthesis, writing, presenting, and reflection.

- Students used various tech tools to do collaborative research in addition to building individual knowledge. They could discuss what they knew as individuals as well as an entire group.

- Students with a variety of abilities were able to research using differentiated web resources and combined learning in a group project.

- Content and media creation is available to everyone in the school community and the principles of intellectual property can be explored. Examples:

- The school created its own internal "YouTube" to showcase the best of the best creative and academic products.

- The entire school community learned how to strike a balance between content creation and the ethics associated with intellectual and creative property.

- The entire school community used the Creative Commons and other content repositories to build and share content that can be repurposed and shared.

- Expanded ideas of fair use were promoted such as those included in "The Code of Best Practices in Fair Use for Media Literacy Education," available at http://www.centerforsocialmedia.org/resources/publications/code_for_media_literacy_education, and Joyce Va-



TEEN PROTAGONISTS I

The last child. John Hart. Minotaur, 2009. \$24.95. 978-0-312-35932-4. Grades 11-12. A year after his twin sister disappeared, Johnny Merrimon, thirteen, continues his search for her. Grittily realistic, heart-breaking, and hopeful, this look at those who prey on children and those who protect them is a true page turner.

The magicians. Lev Grossman. Viking, 2009. \$26.95. 978-0-670-02055-3. Grades 11-12. Brooklyn high school senior Quentin Coldwater, novice magician, dreamer, and misfit, finds himself transported to Brakebills, a magicians' college in upstate New York. Quentin and his friends navigate love, college, and dangerous situations in this fantasy.

The outlawer. Gil Adamson. Harper Perennial, 2009. \$14.99. 978-0-061-49134-4. Grades 9-12. This outstanding novel puts the reader with nineteen-year-old widow Mary Boulton who is fleeing for her life across the Western wilderness in 1903. Breathtaking immediacy, stunning tragedy, and realistic adventure make this an excellent read.

The story of Edgar Sawtelle. David Wroblewski. Ecco, 2008. \$25.95. 978-0-061-37422-7. Grades 9-12. Edgar, born mute, works with his parents to raise dogs of a special breed and one of them is his beloved lifelong pet Almondine. The family's idyllic existence changes when Edgar's uncle arrives.

Virgin of Small Plains. Nancy Pickard. Ballantine, 2007. \$13.95. 978-0-345-47100-0. Grades 9-12. The lives of best friends Mitch, Abby, and Rex are radically altered when a teenaged girl is found dead in a field. Seventeen years later, Mitch returns to town, unearthing long held secrets and stunning revelations.

lenza's article "New Fair Use Code of Practice: A Call to Action" available at <http://www.schoollibraryjournal.com/blog/1340000334/post/1200036320.html?q=fair+use>.

■ The research skills using information literacy models are expanded into the larger realm of 21st century skills. Examples:

- During a research project, media literacy, creative thinking, and critical thinking were stressed.

- Research skills regarding guided inquiry were matched to new standards at both state and national teacher-librarian conferences.

■ Tech tools can be selected with specific 21st century skills in mind (critical thinking, problem solving, collaboration, information literacy, ICT literacy, flexibility, innovation, creativity, global competence, and environmental literacy). See the MILE Guide from the Partnership for 21st Century Learning (2009). Example:

- In a study of African countries, the class used Google Maps to peer into the actual geography, culture, with a sense of real time exploration to enhance true global understanding that could not be done with print or other multimedia.

Evidence of the effect of technology on learning how to learn is collected and reported widely.

CREATIVITY AND CONTENT CREATION

■ The web opens the flood gates to individual and group creation of serious content. Examples:

- Students wrote for Wikipedia and published serious reports/projects on YouTube and other sites hoping they would go viral.

- Students used various technologies to present information about how to not only find information, but how to use information effectively on Facebook.

- In a global learning experience, groups of students were formed including members from other countries. In spite of language difficulties, joint mashups were made.

- Students took folktales from various cultures in their global groups and re-wrote them with a different cultural perspective. Video re-enactments of both versions were made and shared.

■ Both formal learning and informal learning combine to build the creative and the serious self. Example:

- A band instructor encouraged self-creation and performance both at school and at home via music generation software and performance that went global.

Evidence of the effect of technology on creativity and content creation is collected and reported widely.

INCLUSION OF DIFFERENT TYPES OF LEARNERS

- Various assistive devices provide opportunities to those with physical disabilities such as low vision, deafness, and limited mobility. Examples:

- The Geek squad produced a Jing video about text-to-speech software on various devices and played the video to the entire school with a challenge to teach the skill to family members or neighbors who might benefit.

- Text-to-speech software allowed those with low vision or are completely blind to listen to texts.

- Skype and other communication technologies allowed children and teens to communicate in real time across the world.

- IVC (Interactive Video conferencing) enabled deaf learners to communicate by signing.

- Chronically ill students continued to be involved in school projects by using online technologies.

- Both adults and students organized class tests, assignment calendars, and student folders using Web 2.0 tools so disasters such as hurricanes, epidemics, and power outages did not stop school.

- Various tools such as Kindle were analyzed and tested by students for their usefulness as inclusion.

■ Teacher-librarians build expertise along with technology staff of the school to be masters at wise and effective use of

technology in order to boost the quality of teaching and learning. Examples:

- Teachers with an instructional problem in their classroom often came to the teacher-librarian for recommendations on just the right Web 2.0 tool to use together in solving the problem.

- Technology programs at conferences were regularly attended as professionals incorporated the best ideas encountered into their schools for students with learning, physical, and attitudinal challenges.

■ Second language learners benefit with tools that build reading, writing, and sharing skills, as well as tools that bridge the language gap such as visuals, mind mapping, vocabulary boosts, and translation tools. Examples:

- A class used BookFlix to read children's books in English and Spanish.

- Databases and other online resources were available in a variety of languages for the students' use during a project they were working on.

- Individualized tutoring technologies such as "My Reading Coach" helped children learn to speak and read English.

- ESL students found technology tools to be more forgiving of their mistakes and thus were more motivated to return to them for further language instruction.

■ Tools and options that appeal to various learning styles are offered as a matter of accomplishing any task or assignment. Examples:

- The ability to collaborate with others helped students learn from one another in a less threatening environment.

- Students were able to continue work at home or in other locations via the Internet, using online document producers, flash drives, and e-mail.

- Class presentations were created in a variety of formats, combining student skills and experiences.

■ Non-traditional learners are provided the tools needed to both engage them and include them in the learning at hand. Examples:

- Shy but articulate students who did not speak out in class suddenly bloomed in



HOW THINGS WORK—U.S. GOVERNMENT

Constitution day (First Step Nonfiction—American Holidays). Robin Nelson. Lerner, 2010. \$15.95. 978-0-7613-4930-3. Grades K-2. Emergent readers learn about this special day with short, easy language, and colorful photographs. A simple timeline, picture glossary, and an index are included.

The Declaration of Independence in translation: What it really means (Fact Finders. Kids' Translations). Amie Jane Leavitt. Capstone Press, 2009. 978-1-4296-1929-5. \$21.12. Grades 3-5. Controlled vocabulary, word bubble explanations, timelines, and primary source documents offer a clear understanding about the topic. In addition to a glossary there is a humorous Translation Guide for words like "redress—No, we're not talking about putting your clothes on again..." Table of contents, Internet sites, and an index are also provided.

A signer for independence: John Hancock (We the People). Lucia Raatma. Compass Point Books, 2009. 978-0-7666-4122-4. \$20.25. Grades 2-5. Told with a narrative tone, this series helps readers learn about influential people in history. Historical documents, maps, and illustrations support the text. Back matter includes a glossary, timeline, an index, and other source material.

Understanding the Bill of Rights (Documenting Early America). Sally Senzell Isaacs. Crabtree Publishing, 2009. 978-0-7787-4374-3. \$23.94. Grades 3-5. Enhanced with color photos and illustrations, the clear text presents the basic facts about the Bill of Rights. The snapshot version of the Ten Amendments is easy to understand, and then the Amendments are discussed through historical and current viewpoints. A timeline, web sites, glossary, and an index round out the volume.

online collaboration and discussions.

- Conversely, students who were excellent speakers but poor writers applied their talents using a variety of media as they completed assignments, all accepted by the teacher.
- Evidence of the effect of technology on inclusion of different types of learners is collected and reported widely.

ORGANIZATIONAL CONCERNS AND SUPPORT

■ The technology leadership team of the school and district include tech directors, administrators, teacher technologists, teacher-librarians, representatives of the faculty, and representatives of the students and their parents. Examples:

- When doing renovation, teacher-librarians and the technology staff were housed in the same facility and therefore could work even closer together.
- Tech savvy teachers along with the tech director and the teacher-librarian formed a professional learning community charged with maximizing the effect of technology on teaching and learning.
- The school and district provide equitable access to networks and devices as well as access to information and resources that promote excellence in teaching and learning.

■ Robust wireless access is available throughout the school, in particular the learning commons. Example:

- The IEEE standard 802.11g was replaced by 802.11n that provided ubiquitous access to an entire school community.
- Emergence from a school library and computer lab into a Learning Commons concept is an important aspect of moving to the center of teaching and learning.

■ Each student is equipped with a device of choice to access materials and resources 24/7/365. Example:

- In anticipation of the installation of an 802.11n standard network, the district committed to open each school's network to any and all devices that various students owned personally in addition to those purchased by the school.

■ Expertise to assist with networking, trouble shooting, peer tutoring, and developing technological expertise includes both adult experts and peers in a "you help me, I help you, and we all learn together" atmosphere. Examples:

- The school geek squad of students had a mission to be of assistance to every teacher and student in the building. They prided themselves in being able to teach the entire school a new application in a matter of hours or days.
- Technology leaders developed a wide range of "experts" within the system and readily facilitated the expansion of teaching and learning across the learning community.
- Entire departments of tech "experts" were organized at the district level to assist with technology concerns encountered in teaching and learning.

■ Professional development in technology focuses on long-term sustainability of both best practices using technology and experimental applications and strategies that affect teaching and learning.

- Students are considered partners in the development of technology systems, practices, policies, as well as dissemination, and other issues related to the spectrum of utilizing technology in education.
- The Learning Commons staff has the responsibility to provide the rich and high quality information environment in which learners can thrive. Such an environment requires a substantial financial commitment to provide the information and media plus the networks and technologies to access it.
- The foundational principles of intellectual freedom extend to networks, devices, tools, and information.
- Partnerships with other organizations, the community, consortia, and granting agencies provide the wherewithal to implement the constant change and improvement required to keep pace with technology.

■ Teacher-librarians along with other technology professionals collect data about the effect of technology on teaching and learning over and above reports concerning networks, computers, and spending on software/databases. Example:

- The teacher-librarian recommended several Web 2.0 solutions to solve the problem of students not writing enough or of high enough quality about what they were reading in literature or on other academic topics. The data on the use and effect of those tools was collected and disseminated widely.

CONCLUSION

During the era of No Child Left Behind (2002) excellence was measured in terms of performance on one or several standardized tests. In the new era of Race to the Top (2009) with money flowing presumably toward innovation and multiple measures of achievement, there is a new opportunity for teacher-librarians and teacher technologists if they realize they have the power through technology to move into the center of teaching and learning. There is a great opportunity to have major influence on the drive toward excellence and demonstrate there is power in the results achieved by both individuals and groups; both adults and learners.

Instead of a group of technologies and apps waiting to be used, consider the number of learning and learner challenges for which particular applications are especially good in making a difference.

We suggest that you focus first on the learning problem or challenge; on the problem at hand; that challenge faced. Then and only then introduce particular technologies that you have some confidence will work and that have succeeded in the past. However, do not be afraid to take a risk with newer and more exciting technologies and applications that come down the pike. It all keeps getting better and better; the opportunities get greater; and the track record easier and easier to recognize, document, and report widely.

NATIONAL STANDARDS DOCUMENTS

From AASL

Standards for the 21st-Century Learner: <http://www.ala.org/ala/aasl/aaslproftools/learningstandards/standards.cfm>

From ISTE:

NETS (National Educational Technology Standards) for Students: http://www.iste.org/Content/NavigationMenu/NETS/ForStudents/2007Standards/NETS_for_Students_2007_Standards.pdf

NETS for Teachers: http://www.iste.org/Content/NavigationMenu/NETS/ForTeachers/2008Standards/NETS_T_Standards_Final.pdf

NETS for Administrators: http://www.iste.org/Content/NavigationMenu/NETS/ForAdministrators/2009Standards/NETS-A_2009.pdf

From the Partnership for 21st Century Learning:

Partnership for 21st Century Skills. Route 21: <http://www.21stcenturyskills.org/route21/>

MILE Guide (Milestones for Improving Learning & Education) http://www.21stcenturyskills.org/documents/MILE_Guide_091101.pdf

MILE Guide Chart: http://www.21stcenturyskills.org/images/stories/otherdocs/p21up_MILE_Guide_Chart.pdf

MILE Guide Online Assessment: http://www.21stcenturyskills.org/index.php?option=com_wrapper&Itemid=95

MILE Guide Workshop Kit: http://www.21stcenturyskills.org/images/stories/otherdocs/p21up_MILE_Guide_Workshop_Kit.pdf

The Intellectual and Policy Foundations of the 21st Century Skills Framework: <http://www.21stcenturyskills.org/route21/images/>

International perspectives:

Co INCITS (International Committee for Information Technology Standards): http://www.incits.org/new_stdts.htm

From the U.S. Government:

National Educational Technology Plan: <https://edtechfuture.org/>

Common Core Standards Initiative: <http://www.corestandards.org/>

STATE STANDARDS DOCUMENTS (SAMPLES)

- Arizona Technology Standards: <http://www.ade.state.az.us/standards/technology/>

- Massachusetts Technology Standards: <http://www.doe.mass.edu/edtech/standards.html>

- Washington Educational Technology Standards: <http://www.k12.wa.us/edtech/techstandards.aspx>

Check out your own state or Provincial government for technology standards.

OTHER INFORMATION

14 Ways K-12 Librarians Can Teach Social Media: <http://www.techlearning.com/edtorblogs/23558>

21st Century Skills Support Systems Implementation Guides (draft): <http://www.weareteachers.com/web/407596/dissuiss>

30+ Alternatives to YouTube: <http://www.freeteach4teachers.com/2009/06/30-alternatives-to-youtube.html>

Boss, S., & Krauss, J. (2008). *Reinventing Project-Based Learning*. Washington, DC: ISTE.

Center for Safe and Responsible Internet Use: <http://csriu.org/>

Challenge Based Learning: <http://ali.apple.com/cbl/index.html>

Consortium for School Networking. (2009, May). Leadership for Web 2.0 in Education: Promise and Reality: <http://www.cosn.org/Default.aspx?id=85&tabid=4189>



GRAPHIC NOVELS

LOVE AND LASAGNA

Garfield: 30 Years of laughs & lasagna. Jim Davis. Ballantine, 2008. \$35. 978-0-345-50379-4. Grades 4 and up. This is an ideal introduction to the famous fat cat comic strip. This work is organized by decade with a selection of some of the clearest and funniest strips that rely least on ongoing continuity. Printed on high-quality paper, the full-color Sunday strips glow as they never did in the newspapers. Inset pages give sketches of minor characters along with behind-the-scenes comments from their creator. Most important, the humor is just as sharp as ever with perfectly timed reveals (as in Garfield's lazy quest for the remote control) and multiple punch lines in the same strip (as when Garfield glues Jon first to his chair and then to his plate).

Papillon 1 (Vols. 1-4). Miwa Ueda. Del Rey Manga, 2008-9. Vol. 1: 978-0-345-50519-4. \$10.95. Grades 7 and up. *Papillon* uses familiar stories like *Cinderella*—a butterfly emerging from her cocoon—in delightfully refreshing ways. Ageha has always been in her twin sister's shadow. When Ageha finally musters up the courage to go on a (sort-of) date with the boy of her dreams, Hana helps her pick out her clothes and wishes her luck...then shows up in a better outfit and steals the boy away from Ageha. Her sister is alternately charming and devious, and Ageha's secret weapon—another darkly handsome young man—adds both mystery and romance to an otherwise simple love triangle. The allure of this other young man lends an edge to the love story.

Digital Transformation: A Framework for ICT Literacy—A Report of the International ICT Literacy Panel. Princeton, NJ: Educational Testing Service. http://www.ets.org/Media/Tests/Information_and_Communication_Technology_Literacy/ictreport.pdf

Digitteen: A web page for a digital citizenship group project between Qatar Academy, Westwood Schools in Camilla, Georgia USA, and Vienna International School in Vienna, Austria. Available at <http://digitteen.wikispaces.com/>

Fitzgerald, M. A., Orey, M., & Branch, R. M. (annual). *Educational Media and Technology Yearbook*. Santa Barbara, CA: Libraries Unlimited.

Free the standards: <http://www.school-libraryjournal.com/blog/1340000334/post/1590046559.html>

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Google Co-founder Sergy Brin Wants More Computers in Schools: <http://latimesblogs.latimes.com/technology/2009/10/sergey-brin-put-computers-in-schools-.html>

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