



Essential Learning with Digital Tools, the Internet, and Web 2.0

Note: The following excerpt is from ***Reinventing Project-Based Learning: Your Field Guide to Real-World Projects in the Digital Age*** by Suzie Boss and Jane Krauss, available from ISTE Publications (www.iste.org).

With the information universe rapidly expanding, devices burgeoning, and Web-based applications multiplying almost too quickly to track, any mastery of information or tools today will be inadequate tomorrow. Rather than scrambling to keep on top of an ever-growing assortment of tools, focus instead on *essential learning functions* that are useful for project-based learning. This appendix examines eight key learning functions and then lists supporting technologies by the functions they deliver.

Ubiquity: *Learn inside and outside the classroom and all the time*

Deep learning: *Make meaning from original works and raw data*

Making things visible and discussable: *Bringing ideas into the open allows us to talk about—and make—meaning*

Expressing ourselves, sharing ideas, building community: *Learning is a social endeavor*

Collaboration: *Teach and learn with others near and far*

Research: *Directories, search, and bookmarking tools aid investigations*

Project management: *Tools support this key life skill*

Reflection and iteration: *Meaningful work is care-ful work*

Unlike the tools that serve them, these learning functions remain fairly stable. In project-based learning, having the functional ability to *make things visible and discussable* or to *foster collaboration* will always be important. Once you identify a function you need, look for the tools that serve those functions best.

Following is a brief description of each essential learning function, a look at how it relates to 21st-century learning, and an example of tools that deliver that function. The list is not exhaustive, but provides a glimpse of the kind of things you might look for. You can find the latest version of this appendix on the authors' *Reinventing Project-Based Learning* blog (<http://reinventingpbl.blogspot.com>).

1. Ubiquity

Learn inside and outside the classroom and all the time

Imagine what you and your students could do if you had the opportunity to learn anytime and anywhere. While “ubiquity” is not a learning function per se, it is an overarching and desirable quality of tools that support project learning. Anytime-anywhere access to information, web-based productivity tools, and multiple communications options are especially suited to project-based learning. When a project breaks through the space



and time of school into the larger world, ubiquity becomes something of real value. From handheld devices to web-based applications, look for tools that help students learn wherever they are, whenever they want, and more frequently, with whomever they want.

Portable computing devices. Basic laptop and handheld computers let learners tap into their studies and work with others from anywhere. A laptop is a laptop, but what is a “handheld computer”? Portable digital gadgetry is expanding quickly, and a “handheld” computer is not just a miniature computer anymore. Mobile phones, GPS, cameras, MP3 players, wireless capability are combining with small computers into new devices that make switching from one learning function to another easy. And adding peripherals expands their functionality. Some ideas: Attach a digital recorder to a device with an MP3 (audio) player and conduct “man on the street” interviews or capture soundscapes from nature. Attach probeware to a portable computing device and collect field data to send by email. Send photos or video from a phone directly to a blog to report on an event as it unfolds. *Idea: With your students, make an “asset map” of your portable devices and imagine ways to put these digital assets to work.*

Learn More: Read technology reviews from *Engadget*, *TechCrunch*, and similar sites to keep up with new technologies. Set up a news reader and track reviews from these sites, and follow tech mavens like David Pogue of the *New York Times*:
feed://pogue.blogs.nytimes.com/rss2.xml.

Mobile phones. Mobile phones are turning into multifunctional gadgets like those above, but even as “just a phone,” they offer useful learning functions. Most of today’s phones let you talk, photograph, do text messaging, and browse the internet from most anywhere. *Idea: Use increasingly more powerful speakers in mobile phones to turn one-to-one calls into conference calls when your class calls half way around the world.*

Public Wireless Internet. Wireless internet connectivity (“WiFi”) allows users to link their portable computing devices with the internet at little or no expense. Many public libraries, cafés, and other gathering spots supply free wireless internet “hotspots.” Check the WiFi FreeSpot™ Directory www.wififreespot.com for free WiFi in the U.S. and Europe. San Francisco, Houston, Caracas, Stuttgart, London, Xi’an, Paris, Singapore, and other municipalities are creating either wireless hotspot grids or “cloud” WiMax networks for free and ready access.

Users of smart phones (iPhone, Blackberry Storm) can connect to the internet using WiFi, or use 3G cell phone data relay to get on the web.

Idea: Think about class or team trips ahead. How might ready internet access be useful for real-time interactions—sending and receiving data, reporting “from the field” and more?

Web-based mail and instant messaging. Web-based mail allows email access from any networked computer, freeing users from their desktop mail programs. Many young people use webmail services exclusively, and associate their email accounts with instant-messaging services. Yahoo! Mail, MSN Hotmail, and Gmail are three web email services students subscribe to frequently in the U.S.

Schools using learning management systems can supply restricted email services for their students through them, and new Google Apps Education Edition includes hosted email communication and collaboration applications (a great combination). Something else to consider: Many Web 2.0 services, including personalized web pages (Netvibes,



Protopages) require authentication, and that usually means accounts are associated with email addresses.

Idea: With talk with your teaching colleagues and technology specialist about school policies around email. Weigh the benefits of using email communication with other options like blogs and wikis. You may decide to create team email accounts for small groups to share in order to consult with experts and register for Web 2.0 applications or personalized web pages.

Microblogging with Twitter and Edmodo. Twitter is a free social networking and microblogging service that lets users send and receive short messages of up to 140 characters. Users follow each other's "tweets" by subscribing as "followers." Users can send and receive tweets using the Twitter website or tiny "client" applets such as Twirl and Twitterfeed. In addition, there are a variety of Twitter texting options for mobile phones. www.twitter.com

Edmodo is a private microblogging platform built for use by teachers and students. Edmodo provides a secure way for teachers and students to share notes, links, and files. Teachers can send alerts, events, and assignments to students. Edmodo also has a public component that allows the teacher to post any item to a public timeline at his or her discretion. Edmodo also works with mobile phones. <http://blog.edmodo.com>.

Idea: Use a microblogging tool to create a "back channel" during class discussions. A back channel allows students to ask questions and make comments in real time, potentially increasing both engagement and understanding. By using back channels, some teachers report a spike in participation among students who are reluctant to speak up in class.

Portable productivity—little gadgets and "cloud" computing. Learners need no longer rely on access to the computers at home or school in order to create, transfer, store, and share digital information. Two options that make productivity more portable for anywhere-anytime learning include tiny storage devices and web-based "office" software.

First, USB "thumb" drives, small digital storage devices, are an inexpensive tool for storing and sharing files. Every class should keep a few on hand for easy file swapping.

Second, proliferating web-based applications (drawing, writing, spreadsheet, and even presentation software) allow students to create, collaborate, store, and access digital work products from any internet-ready computer. Google and Zoho Virtual Office are two of many web services that provide an applications "suite." When students can pluck their schoolwork down from the web where they created and stored it, you will no longer hear, "I left it at home."

Idea: Set up a collaborative document in Google or Zoho and see how you and a remote partner can work on it at the same time. Imagine ways to use the applications with students and their collaborators.

2. Deep learning

Make meaning from original works and raw data

Most websites students go to for information either explain or report (and now with blogs, opine). Go beyond "filtered" information where meaning is made by others, and help



students find and make sense of “raw” information on the web. Primary sources (i.e., digitized versions of historical documents) and rich databases (i.e., real-time data) are becoming more accessible all the time. Higher-order thinking is engaged when students have to navigate and sort, organize, analyze, and make graphical representations in order to learn and express learning. And as information piles higher and higher, tools such as spreadsheets and relational databases can help students grapple with what they find.

Here is an assortment of primary source repositories and archival collections:

- American Memories Project—U.S. Library of Congress collection has documents, images, film, and more.
<http://memory.loc.gov/ammem/index.html>
- America’s Story—U.S. Library of Congress repository for younger learners.
www.americasstory.com/cgi-bin/page.cgi
- British Museum’s Learning Art & Images—Try the magnifier tool!
<http://www.bl.uk/learning/artimages/index.html>
- Library of Congress—Directory of Primary and Secondary Sources
<http://memory.loc.gov/learn/start/inres/world/primary.html>
- National Archives, Educators and Students—Guides students as they conduct research using primary sources.
www.archives.gov/education/index.html
- Repositories of Primary Sources—Managed by the University of Idaho.
www.uidaho.edu/special-collections/Other.Repositories.html
- World Factbook—Maintained by the Central Intelligence Agency, the World Factbook provides information on history, people, government, economy, geography, communications, transportation, military, and other issues for more than 250 countries. www.cia.gov/cia/publications/factbook

Mining real-time data is possible in the “everything is information” age. The Center for Innovation in Engineering and Science Education (CIESE) has compiled more than 100 real-time data sources at www.k12science.org/realtimedatasites.html. Here are a few to help you imagine the possibilities:

- Radio Meteors—Listen and track meteors as they enter the Earth’s atmosphere
- Oceanweather.inc—Collect real-time weather data from ships and buoys
- Morbidity and Mortality Weekly Report—Use up-to-the-minute data to chart health trends
- WhaleNet Active Satellite Tags—Use satellite monitoring data to track whale migration

Other real-time data sets are available from these sources:

- Worldometers—Tickers continuously update world population data, carbon emissions, hunger, deforestation, and more. www.worldometers.info
- United States Geologic Survey—Real-time data on water and earthquakes with geospatial databases. www.usgs.gov
- Numbers in Search of a Problem from SCORE Mathematics—Study sports statistics, stock quotes, lending rates, and more
<http://score.kings.k12.ca.us/junkdrawer.html>

Students can contribute to data sets, too:

- Global Grocery List Project—Students around the world share local grocery prices to build a growing table of data. <http://landmark-project.com/ggl>



Learners can interpret and make visual displays of the data they mine or collect with web-based tools such as spreadsheets, relational databases, and chart and graph creators.

- Google Spreadsheets—This web-based application allows users to upload or create spreadsheets and share, manage, and manipulate data online. <http://docs.google.com>. Zoho Virtual Office and other web-based productivity suites offer spreadsheets, too.
- Database tools to manage, share and explore data:
 - Dabble DB – www.dabbledb.com
 - Lazybase – <http://lazybase.com>
 - ZohoCreator – <http://creator.zoho.com>
- Create-a-Graph—Web-based graph creator at Kid Zone, National Center for Education Statistics. <http://nces.ed.gov/nceskids/createagraph>

3. Making things visible and discuss-able

Bringing ideas into the open allows us to talk about—and make—meaning

There are many good reasons to “make things visible” with digital tools: showing rather than telling, conceptualizing with “mind” maps, seeing things too big or too small or too fast or too slow for the naked eye, examining history through digital artifacts, expressing ideas through photography and multimedia, and conceptualizing with graphical representations, modeling, animation and digital art. A picture is worth a thousand words, and making thoughts and ideas visible and *sharable* is the first step in getting the conversation going.

Maps and more.

Take in a world view. Google Earth makes the world visible and understandable in too many ways to mention. The best way to understand Google Earth is to experience it. “Fly” from your house to Paris. Examine placemarks along the “Silk Road.” See how communities of users share location-specific information with photos and data feeds. Read the Chapter 2 Spotlight about Google Lit Trips (www.googlelittrips.org) for inspiration.

Idea: Learn how Google Earth “mashups” combine the power of Google Earth with real-time information services. Visit Google for Educators:

www.google.com/educators/p_earth.html.

Where are we? Web-based mapping services tap into huge databases to supply precise maps, directions, and landmark tags or “placemarks.” Improve students’ spatial relations and knowledge of geography using interactive maps.

Yahoo! Maps: <http://maps.yahoo.com>

MapQuest: www.mapquest.com

Google Maps: <http://maps.google.com>

Idea: Learn how “mashups” combine the power of maps with real-time information services. Some mashups to get you started:

- Incoming 911 emergency calls in Seattle displayed on a continually refreshing Google map: www.public911.com/911/seattle



- www.kennedy-center.org/explorer/shakespeare

about everything from tectonics to windfarms: www.digitalgeography.co.uk.

Wordle creates a graphic “cloud” from a batch of text. Words that occur more frequently in the text get greater prominence in the resulting cloud. To make an image just the way you like it, apply different fonts, layouts, and color schemes, then do a screen capture and use the picture to display key ideas. www.wordle.net

focus on the themes they commonly valued and then collaborate on a unified “bill.”

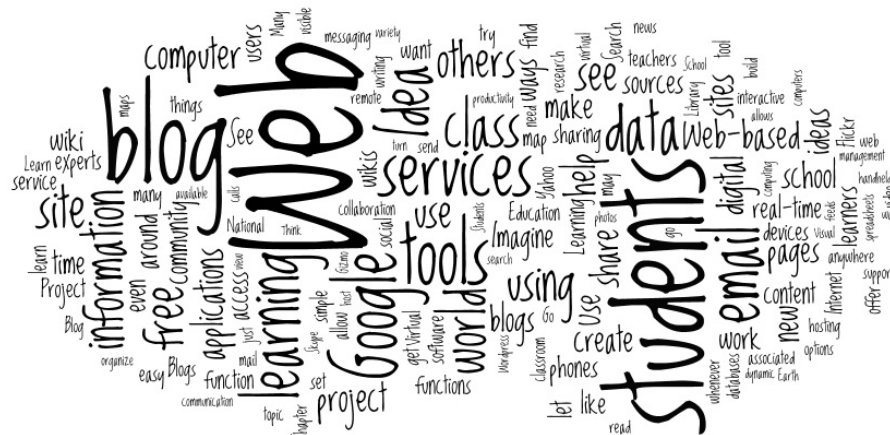


Fig. 1: A “Wordle” of this Appendix

lookups, the Visual Thesaurus requires a subscription at a nominal fee.

www.visualthesaurus.com.

turns into a rich and wonderful exploration.

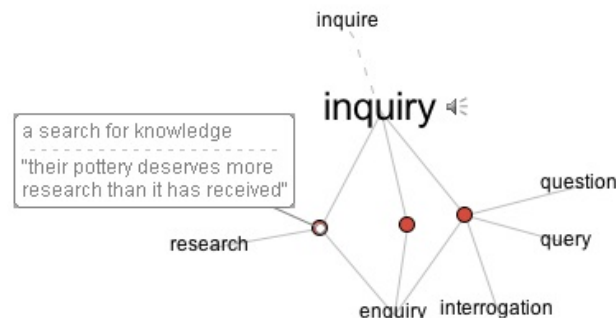




Fig. 2: A Visual Thesaurus view of “Inquiry”

Brainstorming tools: Building on others’ good ideas is a classic brainstorming strategy. Wallwisher is an example of a collaborative tool that lets you share and compare ideas by posting virtual “sticky notes.” www.wallwisher.com

Idea: Early in a project, have students post questions they want to investigate. This offers a different way to introduce the KWL (know-wonder-learn) discussion.

Webcams. As the story goes, the first web camera was trained on a coffee pot, saving the innovator who thought this up the trouble of traveling down several flights of stairs to the staff room only to find an empty pot. Use webcams to view extreme weather, the panorama from the Eiffel Tower, events that unfold over time (such as eaglets hatching), and many zoo exhibits. The site EarthCam tracks thousands of webcams. Stay within their Education domain to avoid questionable content:

[http://search.earthcam.com/search/adv_search.php?cat\[\]=EDU](http://search.earthcam.com/search/adv_search.php?cat[]=EDU)

Idea: Imagine the possibilities for using webcam imagery as you read about UK extreme geographer Tony Cassidy’s Web Cam Wall. Cassidy flows multiple camera feeds into a single PowerPoint slide for a captivating effect.

<http://pilotgcseradicalgeography.co.uk/2007/04/02/web-cam-wall>

Mind mapping. Move beyond classic desktop mind mapping software and try web-based applications that allow simultaneous contributions by remote users. Here are a few to try.

- Mindomo: www.mindomo.com
- Bubbl.us: www.bubbl.us
- Acorn: www.managemyideas.com
- Kayuda: www.kayuda.com
- MindMeister: www.mindmeister.com

Photographs online. Flickr www.flickr.com and Picasa <http://picasa.google.com> are two photosharing web services that are easy and fun to use. Picasa syncs up nicely with a Google Personalized Homepage and is adding community features all the time. Flickr (which along with Delicious put the social “folksonomy” concept on the map) has tagging and sorting functions that encourage collaboration and community building among like-minded users. Many images on Flickr are submitted to the “creative commons” and can be used royalty-free. Search for photographs you can teach with (“diorama” returns 7,302 images), and post students’ photographs into collections to share with others. Consider adding a Flickr feed to illustrate your class blog. See how Meriwether Lewis Elementary School in Portland, Oregon, uses a Flickr feed to show fresh photos on the school’s site: <http://lewiselementary.org>.

Idea: Join a Flickr group such as “Classroom Displays” to see how collaboration happens with this medium. Browse the photos and meet group members who are interested in what we show in our classrooms: www.flickr.com/groups/classrmdisplays. Or, join the Reinventing Project-Based Learning Flickr pool and add to the global showcase of what PBL looks like in action: www.flickr.com/groups/reinventingpbl/

Virtual manipulatives and modeling software. Here are sites and resources that use the power of the web to help students with patterns, data analysis, probability, geometry, physics, chemistry, and even architecture.



- National Library of Virtual Manipulatives, sponsored by the National Science Foundation: <http://nlvm.usu.edu/en/nav/vlibrary.html>.
- The National Council for Teachers of Mathematics hosts interactive applets and associated lessons through their *Illustrations* portal: <http://illustrations.nctm.org>.
- Google Sketchup: Developed for working through the conceptual stages of design, this software allows students to create 3D models. Add Sketchup “buildings” to your Google maps. See Google Educator to get started: www.google.com/educators/p_sketchup.html.

Concept modeling. Intel Corporation offers a set of interactive reasoning tools that help students rate and rank, grapple with forces in systems, and construct a well-reasoned argument. See Visual Ranking, Seeing Reason, and Showing Evidence tools and associated curriculum at www.intel.com/education/tools/index.htm.

4. Expressing ourselves, sharing ideas, building community

Learning is a social endeavor

The World Wide Web has evolved from an information medium into a social medium, and opportunities for expression continue to grow. Students using Facebook, MySpace, Twitter, and instant messaging are accustomed to these forms of personal interaction. Imagine the parallels in school and ways students can use the web to express their ideas and build community around shared interests. Connect your class to the world using a website, blog, wiki, or a virtual world like Second Life. Have students “tag” web content and share tags with others. (You will be surprised how social connections form just by sharing tags.)

Websites, Blogs, and Hybrids

Bottom line, your class will want to have a digital face to the world when you are in project mode. The lines between blogs and web pages is blurring as content management becomes more fluid, and the kind of site you use will depend on the functions you want.

Regular websites. Your district may support class web pages associated with the school site. This may be a first step in transmitting information to the bigger world, but static sites don’t offer the function of two-way communication like blogs and dynamic websites can. If this is how you choose to start letting others know about your projects, be sure to advise families and community members to check in regularly, notify them by email when you update the site, or add RSS syndication so families get notified automatically when you add new content.

If the district does not support class pages, consider trying a free web hosting service. Here are a few that don’t have banner or popup ads (the usual cost of “free” services).

- Google Sites—Online tool for creating and publishing simple web pages. www.google.com/sites. The capacity to associate sharable documents, spreadsheets and presentations with your site makes Google Sites a full-fledged “working” website.
- Doteasy—Free hosting without ad banners. Includes email addresses, unlimited FTP access, and more. www.doteasy.com.





If you want to present many kinds of media like streaming video, news feeds, podcasts or downloadable files, and if you want participation by readers, create a dynamic website or blog. Here is more on these blurring environments, followed by a recommendation for your first efforts.

More web than blog: Check out hosting services that let you build a website with advanced functionality, such as Site 5 and Dreamhost. These offer multiple services beyond hosting and site administration controls for your web pages, including a blog auto installer, email accounts, 15 gigabyte web storage, web mail, and more. Services such as these cost approximately \$10 a month.

More blog than web: You can create web pages along with your blog. Wordpress is one popular and free blog service that does this. Wordpress is free but requires a compatible hosting environment, which will cost approximately \$6 to \$8 a month. Wordpress recommends BlueHost, AN Hosting, Yahoo! Web Hosting, Dream Host, and Laughing Squid.

Beyond the newsletter: Blogs for expression and reporting. (For blogs as a reflection tool, see **Reflection and Iteration**, below. Blogging tools are discussed there, as well.) For the purposes of expression, think of a blog as a simple web page an individual or group uses to present ideas. A student might keep a journal in a blog to share her thoughts. A class might maintain a blog in order to show parents and others what is going on in a project. A blog allows visitors to comment on any article or “post” they read, which is a nice way for students to hear from the outside world. Imagine a class blog with articles as well as syndicated “feeds,” information that flows from sources such as a photo site, a school calendar, a news outlet, or even a dictionary word-of-the-day. Syndicate your class blog so everyone who reads it knows whenever something new has been posted.

Idea: Start reading blogs to see how they differ from more static web pages. Look at A Duck with a Blog, a simple class blog where young students published on a single topic over several months. Notice the Clustr map showing visits to the blog from around the world. <http://duckdiaries.edublogs.org>.

Blogs for building community. The community-building part of blogging begins when bloggers loosely connect around a shared topic of interest. The prolific “edublogger” community (see a short list in Chapter 1) includes up-to-date, provocative writers who share their thoughts on education and offer dispatches from the field. They report and opine about education technologies, conference proceedings, school reform efforts, their own workshops, and interactions with educators and kids. Bloggers often publish a blogroll, a set of links to other bloggers with whom they feel kinship.

Idea: Read a blog on a topic of interest and see how that author connects you to other bloggers. Blogs are bountiful sources of information. After you read for a while, you will settle in with those bloggers whose expertise and authority you trust.

Get started. A class blog will serve you in myriad ways and can be easier to maintain than more complex dynamic websites. To begin, explore the functions of a free blog service like Edublog, Blogger, or Class Blogmeister. If you want more design options and administrative controls, try Wordpress, which is also free. With your free blog, you can publish news as you would in a paper newsletter and add pictures easily. But, unlike newsletters, a blog invites participation. When visitors come to the site, they can write





comments about the postings they read, and even comment on comments. You can send automated email updates to everyone interested in your class blog whenever you change material on the site. To do this, set up Feedburner which recognizes when new content is added to your site and pushes it out to subscribers as email. Feedburner works behind the scenes, taking care of list management and verification and responding whenever new content is available to send. Because Feedburner sends out an update as email, recipients are likely to reply to you in email, too—just another way your blog can invite interaction. To see an example of a school site that uses Feedburner, see Sellwood Middle School in Portland, Oregon. Look for "Subscribe to Sellwood News" to get the idea. www.sellwoodmiddleschool.org/alpha.

Digital storytelling—and more. A variety of tools allow students to construct a compelling narrative by combining images, text, and sound. For examples of digital stories along with case studies from K-12 classrooms, see the Center for Digital Storytelling. www.storycenter.org
VoiceThread takes the idea another step by allowing viewers to comment, through text or audio, making a story into a conversation. <http://voicethread.com>

5. Collaboration: Teaching and learning with others

Teach and learn with others near and far

Projects invite collaboration. Tools abound that help us learn together. Use exchange services to find experts or fellow learners. Use shared web applications to plan and write together. Plan virtual experiences that allow people to “meet.” Use survey tools to take the pulse of the community.

Examples: wikis, Google Docs & Spreadsheets, podcasts and webinars, survey tools

Engage Experts. Chapter 4 has readers create an asset map, a visual display of all the talent, tools, spaces, and support that can be put to use for project learning. As you seek expertise, look back at your asset map and think about experts in your own community whom you might engage. Think of ways to interact with them both in person and via email, a wiki, or other digital tools. Once you’ve exhausted local resources, turn to remote experts for help. The nearest university may be the place to start, or consider one of these clearinghouses:

- *The Virtual Reference Desk AskA+ Service* from the Digital Education Reference Initiative introduces students to research librarians who are experts on topics from architecture to zoology: <http://vrd.askvrd.org/default.aspx>
- *The Electronic Emissary* hosted by the School of Education at the College of William & Mary helps K-12 teachers and students locate mentors who are experts in various disciplines <http://emissary.wm.edu>

Engage other learners. Think about your project. Who would be interested in studying with you? A school nearby, older adults, college students, a classroom across the world? Imagine who shares an interest in your topic and engage them.

To find remote collaborators, visit project clearinghouses to connect your students with other learners studying the same topic. Classroom 2.0 is a great network for finding like-minded partners. See www.classroom20.com





If a project idea hasn't emerged yet, set up a simple email exchange and see where it goes. IECC is a good place to start an email exchange. Since 1992, the Intercultural E-mail Classroom Connections (IECC) service has helped teachers around the globe arrange intercultural email connections between their students. A new service, IECC-INTERGEN, helps teachers and their classrooms create intergenerational partnerships with volunteers who are over 50 years of age. <http://www.iecc.org>.

Schedule a meeting, conduct a poll. Trying to schedule meetings with collaborators? Want to poll your students, the student body, project collaborators or the community? Use the easy scheduling and polling program Doodle. <http://doodle.com>

Hold virtual meetings. Use virtual meeting software to host meetings with anyone in the world. Virtual meeting brokers allow remote participants to interact and even take turns controlling the meeting. Services can include screen sharing, white boards, chat and more. Test out these virtual meeting services for free before subscribing.

Webex: www.webex.com

Adobe Connect: <https://onlineservices.adobe.com>

GoToMeeting: www.gotomeeting.com

Connect through webinars. A webinar is a web-based seminar with video, a presentation area, and participant chat. Imagine having an expert “visit” your class via computer projection. With a webinar service, a webcam and a microphone, presenters and audience can interact as if they are in the same room. Elluminate offers free “vRooms,” where three users (or classrooms) can gather for free.

www.learncentral.org/user/vroomreg

Need to connect more than three at once? Subscribe to Elluminate’s full webinar service or try one of these for free before subscribing.

GoToWebinar: www.gotowebinar.com

Webex: www.webex.com

Idea: Hold virtual office hours in your Elluminate vRoom so students can meet you after school during project “crunch” time.

Talk over the computer. It is now possible to speak to others through your computer as you would over the phone. And see each other to boot. Voice-over internet protocol (or VoIP) services such as Skype, GoogleTalk, and Gizmo let you call from your computer to another computer or to a telephone anywhere in the world. Not only do they support voice, but many services offer instant messaging and video. You are not limited to two-way communication; host a conference call of any reasonable size with Skype or the other services. Imagine your students going home and saying: “I talked with my collaborators in Singapore and Tokyo today.”

- **Skype.** To talk with others through your computers, you all need to have Skype. No set up is necessary for calling ordinary phones. www.skype.com.
- **Gizmo.** Gizmo offers free calling to any Gizmo Project, Yahoo! Messenger, Google Talk, or Windows Live user. www.gizmoproject.com.
- **Google Talk.** Currently, Google’s VoIP is only available for PC computers. Mac users can use Google Video Chat to the same effect if they subscribe to Google Chat or Google Mail. www.google.com/talk.

Collaborate.



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- **Wikis.** A wiki is a great tool for planning and writing together. Organize the site to match the structure of your project, and then invite others to write with you. Wikis are rarely the place to publish a final draft. Think of the wiki as the “workroom,” and a blog or web page as the “showroom.” See more on wikis under **Reflection and Iteration**.
- **Sharable productivity applications.** Collaborate on a web-based product (document, spreadsheet, or presentation) using applications such as Google Docs & Spreadsheets www.docs.google.com or Zoho Productivity and Collaboration Apps www.zoho.com.

6. Research

Directories, search, and bookmarking tools aid investigations

Twenty-first-century projects invariably involve research, and for many research questions, students turn directly to Google. Internet research puts information literacy to the test. Quality directories, search engines with filtering, a variety of bookmark tagging tools, and citation “engines” help students make sense of and organize what they need from the ever-expanding web.

Quality Directories:

- **ASK for Kids**—Designed for K-12 learners, ASK offers a search engine plus study help with an almanac, biography index, dictionary, thesaurus, math, science, and astronomy information, clip art and more. www.askforkids.com
- **InfoPlease**—Many “desk reference” tools. <http://www.infoplease.com>
- **International Children’s Library**—A collection that represents outstanding historical and contemporary books from throughout the world. <http://www.icdlbooks.org>

Kid Search Engines:

- **AOL@School**—A search engine and directory with sites selected by online education experts. www.aolatschool.com/students
- **Kids Click!** —Web search for kids built by librarians. www.kidsclick.org

Safe Search:

- **AltaVista Family Filter**—The family filter option is available from the settings page and may be protected with a password. www.altavista.org
- **Google Safe Search**—Go to the preferences section to turn on filtering. www.google.org
- **Lycos SearchGuard**—Go to the Advanced Search section to set the adult content filter. www.lycos.com
- **Yahoo SafeSearch**—Select preferred SafeSearch setting in Preferences. www.yahoo.com

Bookmarks and Citations: Bookmarking tools help users organize web sources and share ideas about what they find with others. The Citation Machine makes proper acknowledgement of references easy. *Note: More about bookmarking in Chapter 1 Technology Focus: Social Bookmarking.*

- **Delicious** is a web service for storing, annotating, tagging, and sharing web bookmarks. www.delicious.com. Diigo offers similar functions and also allows users to gather in groups organized by shared interests. See a PBL group



example: <http://groups.diigo.com/group/projectbasedlearning>. Both Delicious and Diigo allow you to add buttons to your browser for one-click bookmarking.

- Citation Machine—Teach students to acknowledge the sources they learn from and make the task easy using the Citation Machine from David Warlick's Landmarks Project. Not just for books, the engine creates citations for web, newspapers, and more in common citation formats. <http://citationmachine.net>.

7. Project Management

Tools support this key life skill

Project management is a major category that gets its own treatment in Chapter 5. Briefly, during projects students need to manage time, work, sources, feedback from others, drafts, and products. Digital tools can help students manage these tasks. A simple folder on the district server or a workspace in the school's Learning Management System may suffice, but consider web-based "homepages" or "desktops" that give students a space to work and associated tools (calendars, to-do lists) to help them plan and organize. They can get to their "homepage" from anywhere at any time. Personalized desktops are changing rapidly. See a few in action before selecting the ones to use with students.

Examples:

- Google IG: www.google.com/ig
- MyYahoo: <http://my.yahoo.com>
- Netvibes: www.netvibes.com
- Pageflakes: www.pageflakes.com
- Protopage: www.protopage.com

Idea: Set up your own online workspace and use it for a while to discover ways to use personalized web pages with your students

Learn More: For a screencast tutorial on creating a web homepage in Netvibes, see: Web 2.Education: www.edtechservices.com/blog/netvibes.

8. Reflection and Iteration

Meaningful work is care-ful work

Deep learning happens when you examine your ideas from all sides and from other points of view. Reconsidering and reshaping ideas to bring them to high polish is the difference between yeoman and masterful work. Blogs and wikis give learners the opportunity to shape their work and expose it to the critical feedback of others.

Blogs. A blog can serve as a personal diary or journal where students put their thinking out on the table to give it a good look and elicit alternative perspectives. David Warlick's ClassBlogmiester site lines out a writing process using blogs that promotes cycles of drafting, feedback, and revision.

Blog entries spanning the life of a project let others watch how learning takes shape, and at the end can serve as a lasting artifact of the learning process.

Blogs particularly suited for school:





- EduBlogs—Free blog for teachers, students, and English language learners, supported by WordPress. <http://edublogs.org>
- Blogmeister—Free blog for teachers and students from David Warlick and the Landmark Project. Great advice here on how to use blogs to shape writing. <http://classblogmeister.com>.

Other free blog services, some very easy to use, are listed below. Be careful of features that let student or family readers go to a random “next blog,” or allow spam content to populate comments boxes.

- Blogger: www.blogger.com
- LiveJournal: www.livejournal.com
- MSN Spaces: www.spaces.msn.com
- Moveable Type: www.sixapart.com/moveabletype
- WordPress: www.wordpress.com

Idea: Go to blog host Class Blogmeister to see a variety of classroom blogs from around the United States. <http://classblogmeister.com>. See how students are blogging and then read “Learning as Conversation” at <http://classblogmeister.com/index.php>.

Idea: Go to blog host Edublog and view annual blog award winners in a variety of categories, including Best Group Blog, Best Use of Audio/Video Blog, Most Influential Blog Post, and more.

<http://edublogawards.com>.

Wikis. Wikis are useful for drafting iterations of work and sharing works in progress. Using version histories, a writer (or teacher) can look back at (and even retrieve) earlier drafts. Any number of people can collaborate on a wiki. Imagine the possibilities for sharing, writing, and editing together using a wiki. As the appearance and functionality of wikis steadily improve, some providers refer to their products as “social publishing” websites rather than wikis.

Some wikis are public. For school projects, use administrator controls to limit access to those involved in a class project.

- MediaWiki (engine for Wikipedia): www.mediawiki.org
- PBWorks (previously PBWiki): <http://pbworks.com>
- Wikispaces: www.wikispaces.com
- Wetpaint: www.wetpaint.com

If you are not ready to go “live” with a wiki, try Instiki. The program runs on a classroom computer and can provide a wiki environment from within a classroom. Learn more from this eSchool News article: <http://www.eschoolnews.com/eti/2004/10/000172.php>

Idea: If you have never visited Wikipedia, go to www.wikipedia.org and see what happens when people collectively attempt to explain the world. As of May 2009, Wikipedia displayed 13,000,000+ articles in more than 260 languages, with 2,894,531 articles in English alone.

Idea: Find other teachers who are using wikis and see what is happening in these learning spaces. One to visit: Paul Allison’s High School Online Collaborative Writing wiki: http://schools.wikia.com/wiki/Main_Page.

More Ideas



For a one-stop discussion of web-based applications, examine The Go2Web Applications Index at www.go2web20.net. For a deeper dive into all things technical try TechCrunch www.techcrunch.com, Gizmodo www.gizmodo.com and Engadget www.engadget.com. And for fun that spills across technology and life, try Lifehacker <http://lifehacker.com>.

Final Note:

Technologies come and go in the dynamic Web 2.0 landscape. What new tool functions have captivated you? Do you have ideas and resources that would improve this document? Help us keep it current by contributing to the RPBL Wiki at <http://reinventingpbl.pbworks.com>.