25 Tools, Technologies, and Best Practices: Discover How Your District, School, or Classroom Can Engage in Meaningful, Real-World Learning Experiences.

by Dan Page

PROJECT-BASED LEARNING is a great way to immerse students in a fun, rich, and challenging learning environment. Based on real-life learning simulations, PBL is appropriate for all ages and multiple intelligences. Critical thinking, goal setting, problem solving, and collaborative skills all come into play in PBL, helping to build the skill sets considered essential for knowledge workers in the 21st century.

PBL allows students to see and experience connections across disciplines, while providing a versatile platform for discovering learning strengths and individual interests. When coupled with valid assessment methods. PBL produces measurable and positive results--even in a standards-driven educational environment.

The Web offers an abundance of PBL activities for all grade levels. Adventurous and creative teachers design their own activities and often share them over the Internet. School and district-level administrators can feel confident in promoting PBL because it engages student interest through relevant and meaningful learning projects. What follows is 25 of the top PBL tools. techniques, and resources that will spark up your classroom and take your students to new heights of collaborative learning.

Assessment: Making Sure PBL Is Working

1 Key Elements in PBL Assessment. From building teacher/student connections to encouraging student self-evaluation, PBL assessment benefits students and teachers alike. With Global SchoolNet Foundation, gain insights into key questions about assessing PBL. Discover the importance of "authentic" assessment, which fosters skill development, reflects student learning over time, and builds a measurable mastery of subject matter. Teachers will appreciate the inclusion of ideas and strategies for planning assessments in connection with PBL. Visit www.globalschoolnet.org.

2 Creating Checklists. Checklists help educators organize PBL activities and proactively avoid bumps in the road. In addition, checklists offer a systematic way to view assessment in finite pieces and ensure that students have met the requirements of a project. From the students' viewpoint, checklists are a way of knowing what is expected of them and how they will be graded. Create your own customized, printable checklists and discover examples suited to various grade levels that include several different curriculum topics. A simple online form makes it fast and easy to create assessment checklists. Go to pblchecklist.4teachers.org.

3 Choices of Assessment Tools. A variety of different assessment tools is useful in evaluating student progress with PBL. The tools chosen depend on the project: Assessing individual creativity, for example, will require a different set of tools than is needed for assessing the more traditional tasks of writing, math, or reporting factual information. Get a detailed explanation of teacher/student developed rubrics and how they are a useful evaluation tool. Links are provided to online rubric makers that have proven successful in evaluating PBL. Check out pbhnm.k12.ca.us.

4 Aligning Assessment and Learning. Jeffrey Nowak and Jonathan Plucker of Indiana University characterize PBL as "interdisciplinary of necessity," and call attention to a common weakness in assessment: Evaluation is often not aligned with the project. Compelling examples drive home the need for better alignment between what is being learned and what is being assessed. Nowak and Plucker point to the need to have

students know the assessment guidelines, and the benefit of conducting ongoing assessment throughout a project. Helpful, explicit examples make this a worthwhile read for teachers who want to ensure their assessments are actually measuring the impact of PBL on student gains. Visit www.indiana.edu.

5 Assessing "Understanding" in PBL. Diane McGrath, associate professor of Educational Computing, Design and Online Learning at Kansas State University, provides an overview of important aspects in PBL assessment. Her basic premise is that the role of PBL is to "improve student understanding" of a range of issues and topics, and assessment is one of the tools a teacher uses to do the job. McGrath says that well-designed PBL ensures a common thread connecting teaching, learning, and assessment. She leads readers to look at pertinent questions concerning the design of the assessment instruments, and offers examples of how and why some assessment tools are successful. Use her helpful insights. Visit www.coe.ksu.edu/McGrath.

Cool Products--Making PBL Engaging

6 Fun With Science: Digital Microscopes. Forget the bad old days of stiff necks from bending over a microscope in the biology lab. Today's digital microscopes display images on a computer screen for easy printout and discussion. These powerful and rugged units are perfect for science-focused PBL. Available in desktop or handheld models with touch-and-view technology and automatic focusing--perfect for fieldwork--they start as low as $239 and are available from dozens of manufacturers. Check features and prices with a Google search of digital microscopes. Go to www.discoverthis.com/shopbyage.html to find age-appropriate student models.

7 A Handful of Power. AlphaSmarts are handheld word processors that allow students to take notes, compose essays, write poetry, and work on written assignments no matter where they are. Simple to use, these devices can download documents to a Windows or Mac platform, and students can process them the same as they would a Word document. Ideal for anytime, anywhere assignments often associated with PBL. Bulk purchases drive prices down to around $130. Portable tablets that accept handwriting input are also fun, and useful for adding drawings as well. Go to Google for prices and models, and visit www.alphasmart.com.

8 Write It and Keep It: Smart Boards. Electronic whiteboards have been around for a while. What makes them especially useful for PBL is the collaborative approach they offer for generating and sharing information. Erin Sullivan, head of the middle school at The Willows School in Los Angeles, sings the praises of the new generation of Smart Boards: "You don't have to bother with projectors. You can keep the discussion going, and when it's done you can print out copies or e-mail it to the students. You get more engagement, more retention, because kids aren't so focused on note-taking." Smart Boards come in many sizes. Visit www.smarttech.com.

9 Redefining Photography: Digital Cameras. Digital cameras are widely used in PBL to document, create, and communicate information. Their versatility, ease of use, and affordability have made them indispensable for projects and presentations. Richard Gaskel, a photography instructor at Fessenden School in Newton, MA, says, "With the ability to manipulate, combine, and modify images, digital photography offers an almost unlimited range of possibilities for scientific, artistic, and experiential projects of all kinds." Digital photos provide immediate visual feedback, are easily stored and sent, and of excellent quality. Starting at less than $100, digital cameras have become the workhorse of PBL.

10 Affordable Digital Video. Make a movie! Record a science experiment! Capture the high points of building a rowboat! For a wide range of PBL activities, video was the way to go, but it was too difficult and expensive--until now. Digital Blue has changed everything. Its inexpensive, rugged, easy-to-use video cams have made it practical to record the motion and excitement of PBL. At less than $100, they come with simple and flexible editing software that turns raw footage into powerful communication. Check out the Web site, www.digitalbluecorp.com, and marvel at the cool accessories that will uplevel PBL to superstardom.

Putting PBL to Work in Schools

11 A Real-World Focus. The Alice Carlson Applied Learning Center in Fort Worth, TX, distinguishes itself

with its focus on PBL, making connections to real-world experiences, and collaborative learning. Projects are chosen for their educational value and also for their value to others. There are interested audiences beyond the teacher--and those are reached with project information in the form of brochures, museum-like exhibits, and newsletters. Carlson students are studying Texas history by replanting a prairie, studying the flora and fauna involved, and making connections with Native American ways of life. For a look at an inspired student project, go to www.it.ftworth.isd.tenet.edu/101.

12 A Family/Community Partnership. Learn about a breakthrough college preparatory program that sends students out to work two days a week with mentors in business, non-profit organizations, and government agencies. Families and the entire Providence, RI, community are made part of the program. Authentic assessment through portfolios and rigorous exhibitions keeps kids on their toes. And the depth and breadth of projects is startling: Students have created workshops in biology; writing and producing public-access TV shows; and designing, constructing, and installing solar panels at a Met school. Visit www.metcenter.org.

13 High Tech at New Tech High. You won't find any teachers handing out daily assignments at New Technology High School in Napa, CA. Instead, you'll find students working on long-term projects that may include a written essay, development of a Web site, and a PowerPoint presentation or photo essay. Students present their work in an oral report, either individually or with the group involved. Computer technology and Internet savvy are part of the process, along with time-management skills and group collaboration. To learn more about this techie PBL environment with a Silicon Valley focus, visit www.newtechhigh.org.

14 Immersion in the Adult World. High Tech High School in San Diego is designed more like a workplace than a traditional school. Students there still take a full complement of traditional academic courses geared to the admissions requirements of the University of California, but in addition, each student has a personalized learning plan. Teachers, students, parents, and workplace mentors meet two or three times a year to create the plan--choosing projects, courses or seminars, college courses, and internships. The plan includes goals and timetables. To see how immersion in the adult world becomes a model for performance-based student work and assessment, go to www.hightechhigh.org.

15 International Telementor Program. This unique non-profit program makes a strong case for the power of PBL. Practical projects link students with real-world, corporate professionals in a secure, monitored electronic messaging system. Participating school leaders and educators must have a very strong commitment to student success beyond what topical assessments might show. The focus is on creating and increasing the number of "proactive" (rather than reactive) students in any one classroom. The program supports students who use school as just one of a number of resources to help explore meaningful, self-determined goals in building and leading a well-balanced, quality life outside of and beyond school. See www.telementor.org.

Valuables PBL Resources

16 Pearls of Wisdom. Bob Pearlman is an educational consultant and the former president of the Autodesk Foundation. His Web site offers a sound perspective on PBL. He is especially illuminating on such topics as assessing how traditional schooling is missing the mark, the need to connect kids with real-world experiences, and the importance of collaboration. Not to be missed on the site are the links to examples of creative projects "Leaping Lizards" and "The Big List on PBL." Pearlman's pearls of wisdom are available at www.bobpearlman.org.

17 An Educational Galaxy Far, Far Away. George Lucas, creator of the Star Wars movies, sponsors the George Lucas Educational Foundation, a nonprofit foundation that encourages innovation in schools. Their site offers cutting-edge insights and articles on teaching, technology, and inspiring students. GLEF has embraced the task of documenting, disseminating, and advocating for exemplary K-12 programs in public schools and works to spread the message of best practices nationwide. You'll find detailed articles, in-depth case studies, research summaries, instructional modules, short documentary segments, expert interviews, and links to hundreds of relevant resources. Participate in an online community dedicated to project-based learning at www.glef.org.

18 Strategies, Examples, and Links Galore. This excellent Web site by Project Approach is a good place to find out more about theory that drives PBL, strategies for planning and implementing it, examples, bibliographies, useful links, and opportunities. The treatment encompasses PBL for younger children, where play and exploration are primary components, and for older students, for whom projects are viewed as a complement to the regular academic program. Projects are broadly defined as in-depth investigations of real-world topics worthy of a student's attention. For applying PBL to whole classes or smaller groups, the suggestions and information offered here are invaluable. Visit www.project-approach.com.

19 A Window on PBL Schools. The Web Project is a nonprofit organization devoted to innovative PBL in the arts, humanities, and social sciences by people of all ages. The Project views collaboration, community engagement, and technology as the most powerful tools for PBL. The site includes a PBL Web Ring, an icon that connects to a number of schools and organizations in which PBL plays a central role. To find a lot of PBL practitioners in a hurry, check out www.webproject.org.

20 PBL With Multimedia. Michael Simkins, a former elementary school teacher and principal, is currently the creative director of the Technology Information Center for Administrative Leadership, the California Department of Education's statewide project to support administrators as technology leaders. He runs a one-week summer workshop, "Designing Great Multimedia Projects!" at the Thacher School in Ojai, CA, to assist educators in recognizing the hallmarks of exemplary PBL, selecting the right standards to teach, and assessing project work. The gorgeous setting is matched only by the enriching experience. No need to be a tech wizard to attend. Visit www.members.aol.com/mbsimkins/thacher workshop info.htm.

Inspired PBL Adventures

21 The Jason Project. This nonprofit educational organization is designed to inspire students to a lifelong passion for learning in science. math, and technology. Founded by oceanographer Robert D. Ballard, Jason (named for the Greek myth of Jason and the Argonauts) involves students and teachers in hands-on, real-world scientific discovery. Jason's interdisciplinary science program, Expeditions. enables middle school students to participate in real, standards-based, multidisciplinary research directed by leading scientists. For educators, Jason provides the content and tools to effectively teach middle-grade science. Accredited online professional development courses in science, math, and nonfiction literacy instruction are offered, as well as on-site workshops and coaching. Go to www.jasonproject.org.

22 i-Earn Global Network. Among the world's largest nonprofit global networks, i-Earn enables teachers and students to use the Internet and other new technologies to collaborate on projects that enhance learning and make a difference in the world. A global network of students and teachers engages in collaborative environmental efforts via the Web. The network sponsors an annual event that brings together students from around the world to share information about how they are using technology in social and environmental projects. Visit www.iearn.org.

23 Think Quest. Oracle ThinkQuest has students work in reruns to create the best educational Web sites. The teams' creations are published online in the ThinkQuest Library (www.thinkquest.org/library). This online resource contains more than 5,500 educational Web sites, developed by students for students. The library not only offers a bonanza of PBL ideas, it shows how other students have presented their ideas in award-winning fashion. Student teams compete for exciting prizes, including a trip to ThinkQuest Live, an educational festival celebrating their achievements. Sponsored by the Oracle Education Foundation (www.oraclefoundation.org), the competition offers a vibrant PBL experience to students and teachers around the world. Go to www.thinkquest.org.

24 GOALS. The GlobalOnlineAdventureLearningSitebringsreal_life adventures to the Web. With an emphasis on science, technology, and nature, GOALS' adventures are designed to inspire readers and motivate them to set and meet learning goals of their own. Explorers of all ages will find options for educational projects that will heighten their appreciation and understanding of science, technology, and nature. Visit www.goals.com.

25 NASA Quest. Let students find out for themselves how the scientists and engineers of NASA reach for the stars. From aerospace design to training for space walks, NASA Quest is a rich resource of projects for educators and students who are interested in delving into our national space program. NASA Quest shares

the excitement of an authentic scientific and engineering endeavor--from flying a space shuttle and visiting the International Space Station, to exploring distant planets and building the spacecraft and aircraft of the future. Go to www.quest.arc.nasa.gov.

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