# Rubrics, Portfolios, and Tests, Oh My!

## Assessing Understanding in Project-Based Learning

*By Diane McGrath*

**Subject:** Assessment

**Audience:** Teachers, teacher educators, library media specialists

**Grade Level:** K–12 (Ages 5–18)

**Technology:** Technology-based assessment tools

**Standards:** *NETS•S* 3–6; *NETS•T* II, IV (www.iste.org/standards)

The late Jan Hawkins[1] once gave a brief demonstration that convinced a room full of educational researchers, many of them skeptics, that it is possible to assess individual achievement in group projects. She showed us a four-minute video of a group of students constructing an oscillating fan, showing it to some outside observers, and answering their questions about it. It was dramatically clear to all of us that one person in the student group completely understood the principles involved in building the fan and the three others did not. A show of hands in the audience indicated widespread agreement about who understood the project and who did not.

At that time, I think we needed convincing that it was okay to have students collaborate and that we could distinguish among members of such a collaborative group in assessment. Now in 2003, I think many teachers and researchers are fairly well persuaded that student learning can be assessed even when the end product is an artifact or performance produced by a group, but we fear that the procedures for assessment will be much too time-consuming and impossible to manage.

The issue of alternative assessment is not a simple one and is not easily summarized in the space available here. I am not going to try to do that. Instead, I'd like to focus on a small number of critical assessment issues and to share with you some technological tools that can help you do the job.

Keep in mind that the focus of this column is on the development of understanding through project-based

[1] *Jan Hawkins helped found the Center for Children and Technology in 1980 and later served as vice president at the Education Development Center and professor at Harvard's Graduate School of Education.*

learning (PBL). Thus the issues we examine here are centered around things we must consider to do a good job of improving student understanding and of using assessment as a way of helping us do that job.

**Assessment Issues**

*Multiple Assessments.* In their marvelous book *Understanding by Design*, Grant Wiggins and Jay McTighe insist that it is not simply desirable to have multiple assessments of understanding; in fact, you cannot really assess understanding without multiple assessments all along the way. (*Editor's note:* Find this and other electronic and print resources mentioned throughout the article under Resources on p. 45.) Some of these will be formal, some informal as in a conversation with the student; some assessments will be performances, some tests, some student self-assessments and journaling.

The Rural Trust report *Assessing Student Understanding* agrees that you cannot assess student work by a single task requirement; rather, you must develop a comprehensive picture of how student work has progressed over time.

This is probably where you get scared. Won't it take too much of my time? Won't I have people arguing about their grades? How will I ever accomplish more than I am already doing?!

Well, I can pose two possible answers to that concern. On one hand, yes, things will have to change, and change takes time and is scary. On the other hand, if you design your project so that teaching, learning, and assessment all work together, the multiple assessments will occur naturally.

*Assessing Along the Way.* One of the most critically important issues for assessment is that it should be a learning activity. We have a long history of using assessment only at the end of a project or unit to test what was learned. But what a difference it makes to student learning if they get feedback and coaching, as well as student and outsider critiques, from the very first stages of planning their project. Most adults who are in the kind of profession that requires them to design something routinely get feedback along the way. As I am writing this article, I plan to get feedback from several readers and editors.

As we think about designing a project, we can take another tip from Wiggins and McTighe. We can begin our planning of assessment with the question: What would count as evidence that the learner has achieved the goals for the project? And a corollary to that might be: What kinds of evidence can we observe along the way to see if understanding is growing as the project develops? Do they hit misconceptions or problems in understanding as they go along? Can we fix those misconceptions early on? Can we help students revise their thinking so they will understand? Can we see evidence of explaining, justifying, reasoning, problem solving? If not can we help them to do these things? If we do multiple assessments, including conversations, asking questions, reading student journals or design notebooks, involving other students and even other teachers and parents in asking questions and critiquing, the word *assessment* takes on a much less onerous tone. Instead it really becomes a matter of tracking what the learners are doing and checking in with them as they do it. It becomes much more like collaborating with your students than it does testing them. This kind of assessment helps the learners to work out their misconceptions, seek out new data, learn to evaluate their own understanding and progress, and revise or improve the project they are working on.

*Student Involvement in Setting the Standards for Assessment.* We rarely ask students what they think should be the critical factors addressed as they carry out and present their project. It never occurs to us. That has always been the teacher's job. The National Science Education Standards, however, got me thinking about getting students much more involved in the processes of assessment. The standards document claims that student involvement in assessment helps them to become part of a community of learners and to learn to assess and take responsibility for their own work and to constructively critique the work of other students. The Project-Based Learning with Multimedia CD offers some video examples of teachers involving students in the design of the assessments.

*Outside Assessment of the Final Artifact.* If you have already had many conversations and critiques with your students from the beginning of the project, then the final evaluation should not take students by surprise. But it can take on serious importance to them. It can be a professional experience and highly motivating for students to put that extra measure of effort into their project. This final assessment will depend on the nature of the project, of course. In some cases, it will be a public contest, and one or more of the projects will be winners. In other cases, it might be the presentation of a proposal or product to an outside expert, as for example a proposal to design a particular piece of software, or a playground, or the blueprints to build a house. (The Project-Based Learning and Assessment: Redefining the Classroom video shows how this can work in the classroom.) The experts ask questions, study

the product, and make recommendations—either to accept one product and reasons for it (if it is competitive) or to give feedback on what might make the product better. Grading, of course, is still the province of the teacher, but now the teacher has a good deal of evidence, both in the process of developing the artifact and in the final evaluation by outside experts. We all learn from this process—students, teachers, and even the outside experts.

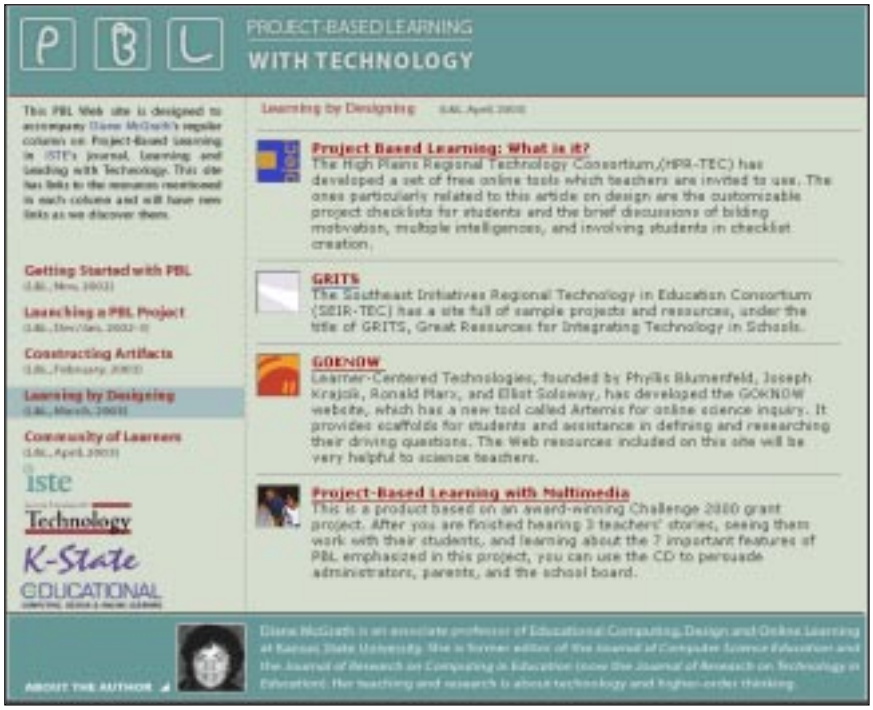
Of course you might not choose to have outside experts, or they might not be available. What else can you do besides give a test? You can give the performance or presentation of the artifact to other teachers, students from another class, the school board, or parents. You can encourage the audience to ask questions and see how the students are able to handle themselves as they explain and justify their project.

*Getting Better.* In a recent study, Julie Erickson and Richard Lehrer (1998) had students construct hypertext documents. They looked at how students developed their own standards for high-quality work. These researchers showed that over a two-year period, sixth and seventh graders gradually developed a much more sophisticated understanding of what constituted good research questions and factors that make a good presentation. This finding reminds me of what I have found in my graduate classes. Students from the current year do better work than those from the previous year when I allow them to see work from the previous year. They get a better sense of what is possible, what has already been done, what standards must have been in place, and what standards they want to add. I have also begun to require them to critique other students' work *before* I see that work, so that everyone can both see what the others are doing and improve what they are doing. It really seems to pay off in the quality of the final project. I have to confess that it also takes time, but the time is mostly theirs, not mine. I simply have to plan for that time at the beginning of the unit.

Most of us are pretty new at teaching and learning through PBL methods, even though the ideas have been around for a long time. We probably had very little experience as students learning in this manner, and as we look around our schools (and universities), we probably don't see many other teachers teaching this way. One of the best things we can do to improve our ability to use PBL methods to increase student understanding is to think about our PBL classroom as a project of our own, one that needs to be examined as we go along, one that needs evidence, explaining and justifying, analyzing, and problem solving just as much as student projects need those things. Even if it adds five minutes to your time each day, it is worth taking a few notes in a journal as you go along about what is working, what is not, things you learn, and things to improve the next time you try a project. Your own standards will evolve as you review your collected evidence.

**Helpful Tools**

In my experience, I have found the main challenge for continuing assessment is to find enough time during class periods to accomplish it. I can ask graduate students to get feedback from three people, write it up, and e-mail it to me. That is not quite so easy to ask of K–12 students. However, one of the wonderful features of PBL is that students get so involved and motivated with authentic projects that they do put in a lot of time outside of class. This means that time in class does not have to be the *only* time they are working on the projects. Time in class can be spent




## AN EVOLVING RESOURCE

After reading this article (and over the summer as you plan for the next school year), check my Project-Based Learning with Technology Web site (http://coe.ksu.edu/pbl/). I keep a collection of the sites I have mentioned in my columns during the volume grouped by the title, making sure the addresses are up-to-date and adding new resources as I find them.

not only working but also critiquing, solving problems, writing in journals, and updating their documentation of their work.

Another big challenge is to find the time and a method for keeping track of your own planning, evaluation of the project, journal notes, and so on. There are a lot of details that go into the planning of a project, and you can't keep track of your own progress if you don't have a good record of what you intended to accomplish in the first place and changes you made along the way.

I have found a number of tools that can help you keep track of your work as a teacher/project planner and one that also helps the students.

*Rubistar.* High Plains Regional Technology in Education Consortium (HPR*TEC) has provided this tool to help you create your own rubrics or checklists (in both English and Spanish) from any of several templates and prompts for different subject areas and different age levels. A rubric is a very popular way of assessing a complex artifact and the progress made toward its completion, and I think you will find that anything that helps you write those rubrics will be greatly appreciated. The site also gives some good ideas about PBL and promotes student input into the creation of checklists.

*Staff Room for Ontario K–12 Teachers.* Find lots of teacher-created rubrics to examine as models at this site. It also includes other forms of assessment and a link to a page of tips for choosing rubrics.

*ALPS Planning Tools.* If you register with the Active Learning Practices for Schools (ALPS) project, you can have access to the Collaborative Curriculum Development Tool and a community of other teachers who communicate through the Web site. This tool provides questions and prompts for you as you design projects, but the main reason I share this with you is that it has a series of questions to keep in mind as you design two kinds of assessment: ongoing assessment and assessment of the performances of understanding.

*Project-Based Learning with Multimedia CD-ROM.* This CD has video examples of projects, interviews with teachers, and a good discussion of the main features of PBL. It also has a planning tool that provides questions and suggestions for planning a project and planning assessments for that project. It saves your plans on your hard drive.

*Progress Portfolio.* Supportive Inquiry-Based Learning Environments (SIBLE), a project funded by the National Science Foundation, provides this inquiry-support tool. This Macintosh-only tool is downloadable (free) and serves as a digital notebook for students to keep track of what they are doing, their research, evidence, and notes. It includes several templates, depending on the subject and style of the research. Although it was designed for science education, it looks promising for other subjects as well. A small camera window allows you to take a picture of anything on your screen and place it in the portfolio. This tool then provides the teachers with a document of ongoing student research, and because the student keeps the portfolio, it can be a real time saver for the teacher.

## Conclusion

This has been a brief overview of some features that strike me as central in the area of assessment of understanding in PBL. I hope it helps you as you work with your students to complete projects that excite them and help them learn content.

## Resources

In addition to Diane McGrath's PBL Web site (See an Evolving Resource, p. **TK**), which expands on resources mentioned in the PBL columns, with annotations and further links, you may also find the following resources useful.

*Books and Articles*

National Research Council. (1995). *National science education standards.* Washington, DC: National Academy of Sciences. Available: www.nap.edu/html/nses/html/.

Rural Trust Documentation & Assessment Team, Harvard Graduate School of Education. (2001). *Assessing student work.* Washington, DC: Author. Available: www.ruraledu.org/assess_guide.pdf.

Wiggins, G., & McTighe, J. (1998). *Understanding by design.* Upper Saddle River, NJ: Merrill/Association for Supervision and Curriculum Development. The introduction and two sample chapters are available at www.ascd.org/readingroom/books/wiggins98toc.html.

*Web Sites*

ALPS: http://learnweb.harvard.edu/alps/

Progress Portfolio: www.ls.sesp.northwestern.edu/sible/

Rubistar: www.4teachers.org/projectbased/

Staff Room for Ontario's K–12 Teachers: Planning Teaching & Reporting Online: www.odyssey.on.ca/%7Elaine.coxon/rubrics.htm

*Video*

Project-Based Learning and Assessment: Redefining the Classroom: Order this $15 video from the George Lucas Educational Foundation (www.glef.org).

*CD-ROM*

Project-Based Learning with Multimedia: Order this $25 CD at www.wested.org/cs/wew/view/rs/608/.

## Reference

Erickson, J., & Lehrer, J. (1998). The evolution of critical standards as students design hypermedia documents. *The Journal of the Learning Sciences, 7*(3&4), 351–386.

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