Clearing up misconceptions about project-based learning

Project-based learning can transform classrooms and schools by encouraging students to learn by doing authentic projects, but despite its power, it is often misunderstood.

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Thirty years ago, when I started as a 6th-grade teacher, I discovered William Heard Kilpatrick and project-based learning from his seminal 1918 article, "The Project Method." That discovery — along with the works and ideas of other progressive educators, like John Dewey, Carl Rogers, John Holt, Sylvia Ashton-Warner, Nancie Atwell, and Frank Smith — transformed my life in education. These pioneering educators shared the common belief that students learn best by doing and making real things that are rooted in the real world. Their vision of good teaching and learning was not students sitting passively in their desks as their teacher lectures. Discovering them was vital to my practice as a teacher. From my first day, I had a project-based classroom (Wolk, 1998).

When I started teaching, resources on the how of project-based learning (PBL) were scarce. Dewey and Kilpatrick were all about theory but not much about actual practice. And their writing was based on life and schooling from almost a century earlier. I had to figure out how to make their ideas work in my classroom.

For the past decade, I have seen Kilpatrick's and Dewey's ideas brought back to life. Unlike when I was teaching, schools and teachers today are doing PBL with vigor. You can read a plethora of articles and books about PBL. You can type #PBL on Twitter and see examples of this exceptional work. You can follow organizations like PBL Works, Edutopia, EL Learning, and the High Tech High schools to gain wisdom on PBL and to see dynamic projects. Yet despite the availability of quality resources, common misunderstandings about PBL persist. So I think it's important to step back and clarify what PBL is, and what it is not, and to share some nuts-and-bolts advice that I wish I had received 30 years ago.

What is project-based learning?

My one-sentence definition of PBL: *Project-based learning is long-term investigations driven by real questions connected to the real world that result in authentic products that show student learning*. This captures the essence of PBL: longer and deeper inquiry, research, student-made products, and connections to the world and life outside of school.

While some projects are done individually or in pairs, most are completed in teams, because learning collaboration skills is an important goal of PBL. The PBL classroom is a collaborative workshop, thrumming with important work, productive talk, visible thinking, and exciting creativity. There is a degree of "messiness" in these classrooms; a visitor may say it looks chaotic, but it is structured and purposeful chaos — sometimes even joyful chaos. Ron Berger (2013) calls PBL classrooms "the hub of creation" (p. 70). Teaching in these spaces is often exhilarating and can renew a teacher's calling and passion.

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Most, if not all, project work is done in class, not as homework. This is essential because project-based learning emphasizes that the *process* is also the *product*. Students learn from the experience of doing projects together in the classroom and out in the real world.

PBL projects take more time than a typical school project. Smaller projects take 2 to 3 weeks, and longer projects run 4 to 10 weeks. Roughly half of that time generally is for research, and the other half is for product design and creation. Students might create podcasts, surveys, interviews, oral histories, picture books, newspapers, magazines, websites, infographics, iMovies, artwork, brochures, comic books, graphs, interactive museum exhibits, games, plays, models, blueprints, gardens, and murals.

PBL is more than projects

While the project students research and create is by far the largest part of a typical PBL unit, teachers still design lessons as part of the unit. A simple diagram can help illustrate this. Traditional teaching with projects looks like this:

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Each hyphen is a separate lesson, and the short line at the end is what many teachers call the "culminating project." For example, a 5th-grade teacher teaches five weeks of lessons on the American Civil War and then assigns students to take three days to make a poster on a famous battle, often as homework.

In PBL, there is no culminating project. The project is not the dessert, it is the main course (Larmer & Mergendoller, 2010). And once a class starts the project, students continue that work every day until it is complete. The momentum sustains students' focus and stamina. A PBL unit looks like this:

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Before the project work begins, a PBL unit opens with about a week of lessons — what I like to call focus activities — represented by those opening hyphens. The activities help students to care about the topic, connect it to the real world, build background knowledge and vocabulary, and teach skills. Most activities take one day and introduce the content of a specific subtopic. For example, here are five days of PBL focus activities on the American Civil War:

- Activity 1: Race in America today: How far has our country come since the Civil War?
- Activity 2: The historical context of the Civil War: American history timeline, 1492-2022
- Activity 3: Geography of the Civil War
- Activity 4: Slavery: What caused the American Civil War?
- Activity 5: Slavery: History and daily life

In the activities, teachers engage students with authentic resources: articles, essays, poetry, videos, artwork, photographs, statistics, literature, primary source documents, speeches, music, and picture books. The textbook is not the curriculum; the entire world is your library.

After the opening week of activities, students take a much deeper dive into the Civil War with the project. Some units can have two projects: a team project and an individual or paired project. These, for example, might be the projects for the Civil War PBL unit:

- *Team Project:* Working in small teams, research our class list of 12 essential questions and three additional questions chosen by your team and create and publish an informational picture book on the American Civil War and slavery.
- *Paired Project:* Interview five diverse members of your community on race and racism in our country today and use the recorded interviews to create a 15-minute podcast with your added commentary and reflection.

Once the project is completed, students share them in a formal presentation or exhibition, ideally to an outside audience.

PBL is for all students in every grade

I suspect many educators see PBL as more appropriate for older students, who can work more independently. And some people say that only certain kids will thrive with PBL. I disagree; PBL is for everyone in all grades.

PBL is based on how people learn in life: If you want to learn how to plant a garden, you need to get on your knees, stick your hands in the dirt, and plant a garden. Humans learn best by doing real things. Same for learning anything in school. This is at the heart of project-based learning.

PBL is as great for 1st graders as it is for middle graders and high schoolers; we just need to design projects that work for younger students. Nell Duke and Anne-Lise Halvorsen (2017) have published research showing the success of their PBL framework, Project PLACE, in primary grades. If we want students to be self-directed learners in the upper grades, we need to show them how to be self-directed learners in the primary grades. By the time they get to 4th grade, they will be PBL veterans.

PBL also should not be confined to well-resourced schools. It is as valuable for students in poverty as it is for affluent students. In 1991, Martin Haberman issued an urgent call to transform the "pedagogy of poverty" characterized by rote instruction, teacher lecture, seatwork, tests, and other practices common in classrooms for children in poverty. I continue to see these practices in many classrooms. Some expensive private schools in my city of Chicago are project-based; why can't all students in Chicago's economically disadvantaged neighborhoods experience the same "elite" PBL learning?

PBL is done in a culture of inquiry

Project-based learning and inquiry-based teaching are symbiotic; they feed off each other to create a powerful holistic experience. Inquiry-based teaching frames curricula around authentic essential questions that students and teachers create together, and then students investigate. Some of these questions won't have single correct answers and will require investigating different perspectives and taking ethical stances.

As teachers, we want to create a culture of inquiry in the classroom. Key to that is being model thinkers and learners for students to emulate. As a teacher, I want to live each day in my classroom being curious and thoughtful about the world and life and important issues. I want to find time for important discussion, sometimes on topics outside of the current unit. Engaging students in regular and authentic discourse is central to a PBL classroom, as it becomes a think tank and a public square. It is in this rich culture of inquiry that project work takes place.

There is direct instruction in PBL

Many think PBL rejects all traditional kinds of teaching and is only about students doing projects. But project-based learning does include traditional teaching, even whole-class direct instruction. PBL teachers teach lessons; they just teach far fewer of them to make time for project work. Like in traditional teaching, lessons involve direct instruction, students reading short texts, and working on collaborative tasks.

A common form of explicit instruction in PBL is the minilesson, a 5- to 15-minute lecture or demonstration that teaches specific content or skills. An eight-week PBL unit on the Civil War would require at least a dozen minilessons on such topics as:

- Northern states and Southern states.
- Two economic systems.
- The Middle Passage.
- Reading skills for informational text.
- How to turn research notes into informational text.

Content and skills matter in PBL

When my education students design PBL units, I have them list the unit goals — what they want their students to learn. Often, their lists of goals focus on not what students will learn but what they will do. But PBL is not just about students doing hands-on projects; it is about learning, including learning content knowledge and skills. This is especially true for reading and writing, which are integrated into nearly every project (Berger, 2013).

The hands-on work of PBL results in substantive learning (Martinez & McGrath, 2014) that we sometimes refer to as "deeper learning." Jal Mehta and Sarah Fine (2019), who've written extensively about deeper learning, acknowledge that it is not easy to define, but generally involves learning that "moves beyond rote learning and shallow testing" (p. 10). For me, deeper learning in PBL includes:

- Connecting knowledge, skills, and dispositions to the real world.
- Making connections between knowledge and across disciplines.
- Applying knowledge and skills in authentic ways.
- Working with knowledge and skills in collaboration with other students.
- Making personal connections to knowledge and ideas.
- Learning in a culture and process of inquiry.
- Applying critical thinking to knowledge and the real world.

Unlike in many classrooms today, students in PBL classrooms are not building inert knowledge, which David Perkins (1995) refers to as the "knowledge equivalent of a couch potato" (p. 22). Such knowledge is inert because students do nothing real with it. They fill in worksheets, write school essays, take tests, and then forget the information they were meant to learn. We want students to *use* and *apply* knowledge and skills in real ways to make their learning relevant and meaningful. Teachers don't do PBL because we care little for content and skills and only care about hands-on learning; we do it because we care about content and skills so much that we want students to really learn it.

Most PBL teaching does not use typical lesson plans

Ask someone to visualize a school lesson, and they will most likely see students sitting in desks as their teacher talks. While that might be true for a PBL classroom during an activity or minilesson, it is not the case for most of the time in a PBL unit. Instead, you'll see students spread all over the classroom (and perhaps the hallway and sometimes outdoors) actively engaged in project work.

A different paradigm of teaching requires a different paradigm of planning. Plans for PBL activities and minilessons look like typical lesson plans, but I suggest teachers write project plans for most of the unit work. Consider a project my students did for math: designing their dream houses and drawing to-scale floorplans. As my students worked on their floorplans and the required math, I moved from student to student, posing questions, giving feedback, offering advice, and teaching and reteaching math. So, my project plan might have this information:

- Notes on students I need to meet with that day about their house project.
- An extra math minilesson I need to do with some students at a table.
- Specific student math or drawing work I need to give feedback on.
- A reminder to share a professional blueprint or other resource with a student.
- A brief class meeting we might need about the project.

PBL teaches standards but goes beyond them.

The organization PBL Works has done excellent work creating its Gold Standard PBL criteria (Buck Institute for Education, 2015). One of the criteria is that PBL units are aligned to standards. One PBL unit can cover myriad learning standards from across the curriculum.

But PBL does not stop at standards; that would be setting the bar too low. We see standards as the floor; the teacher and the project-based inquiry curriculum are the ceiling, or even the sky. In fact, some standards documents lack the necessary substance for a PBL unit. For example, the Common Core State Standards do not include content knowledge for science and social studies, and specific content is very limited in the social science standards for my own state of Illinois. So, standards are not the end goals of a PBL unit; they are the beginning.

When designing a PBL unit, I start with standards and with my own thinking: What knowledge, skills, dispositions, and habits of mind do I think are important for students to learn? My list will include content and skills, but it's also likely to contain dispositions and habits of mind not covered in standards, such as empathy and perseverance. No longer is a fractions unit just about 4th graders learning fractions. In a PBL fractions project, students might work in teams to create surveys on important social issues in their local community and give the survey to hundreds of community members and then use fractions (and writing) to display their results. Their learning goes far beyond math to include knowledge about local issues, civics and social responsibility, critical-thinking skills, collaboration skills, and the dispositions of caring about community and social issues and listening to the diverse voices of community members.

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To make this work, students need to do high-quality projects. The responsibility to design these projects rests on the teacher (sometimes with student input). PBL units should be intellectual and creative. A word I like to use is sophisticated; all students can do *sophisticated* projects, even primary-age students.

PBL requires and teaches organizational skills

Project-based classrooms have many moving parts; PBL teachers are like jugglers with 17 balls in the air. Here are my suggestions for keeping yourself and your students organized: First, at the start of a unit, give students a project sheet that explains the project and lists the specific requirements and dues dates. Second, follow the lead of PBL teacher Dana Gaertner (2021) and create a project map. Gaertner creates a large poster for her classroom wall that explains each step of the project week by week and lists any items that are due. Third, use a tablet or clipboard during project time to take brief notes on student progress and reminders for the following day.

As students complete projects, they learn executive function skills, like time management, that are vital to our personal and professional lives. Typical class assignments, like worksheets or readings, are usually highly controlled tasks that all students complete on the same established timeline. Open and self-directed tasks in PBL require students to plan their work and manage their time. This insight goes all the way back to 1925, when William Heard Kilpatrick wrote about teaching a boy to plant corn: "If you wish corn, give the boy a plan. But if you wish boy rather than corn, that is, if you wish to educate the boy to think and plan for himself, then let him make his own plan" (p. 212).

PBL teachers need to explicitly teach the organizational and management skills that will enable students to plan out their work in a classroom where they are not tied to a desk, following a teacher's plan. PBL teachers should give minilessons on time management and project planning and have students discuss how well the class is working as a community. I suggest PBL teachers end project time a bit early a few days each week for a class meeting to share successes and areas needing improvement. This processing time is an important part of PBL classroom management.

Feedback is more important than a grade

Imagine you spent two hours cooking spaghetti and meatballs for dinner from scratch. Now, dinner is over, and everyone is sitting around the table, and you ask, "Well . . . how was it?" One of your family members pulls out a rubric, fills it out, and says, "82."

I suspect you would not like that response; I would be insulted. Well, that's what school does to students all the time. Some teachers do write comments, but for most of their work, students tend to focus on the number or letter grades as their main feedback at the end of a unit.

PBL has more authentic, student-centered, and holistic assessment. Assessment is not just done at the end of the project or unit but is an inherent part of teaching every day. When PBL teachers are zipping around the classroom helping students with their projects, they are assessing as they teach. A key part of that assessment is giving students feedback as they do their work. If we want students producing their highest-quality work then we need to: 1) have them do the work in the classroom; 2) give them feedback as they progress; and 3) as Ron Berger (2013) advocates, show examples of excellent work, teach them what quality looks like, and have students critique project work.

When the project work is done, the student does get a final assessment, but it does not just come from the teacher. In PBL, student self-assessment can be a vital part of the process. So is getting feedback from a real audience of people from outside the classroom and (ideally) outside the school, sometimes including experts in the kinds of work students are doing.

The power and potential of PBL

We can see the immense power and potential of PBL in many ways, all of which can inspire us to jump in boldly to this growing movement.

First, PBL offers opportunities for students to learn vital 21st-century skills: critical thinking, creative thinking, communication, and collaboration. But PBL allows us to go far beyond these to teach global literacy, media literacy, financial literacy, social justice, multicultural education, empathy, and a host of other desperately needed content, skills, and habits of mind.

Second, PBL can give students the ultimate agency in school: letting them choose what to learn about. Imagine having an hour twice a week for students to work on projects they initiated and shaped into a purposeful project with their teacher — an idea some call Genius Hour. While a student is studying airplanes, two others are investigating the life of hummingbirds, and another student is learning the history of pizza. This is all happening in the same space in an exciting culture of inquiry and curiosity. Every school could find two hours a week to free students to follow their curiosities.

Third, PBL is perfect to combine with literature-based curriculum. In language arts and English, students can do projects after reading a book. And in science, social studies, and math, for some PBL units, instead of doing research — or in addition to the research — students can read a novel or nonfiction book and create a product based on the book.

Fourth, some PBL projects can be designed as problem-based units, which focus on a real problem at the local, national, or global level. Students can study local homelessness, colony collapse disorder in bees, the lack of access to fresh water around the world, the global refugee crisis, or low voter turnout in the U.S. If every year, all students did a problem-based PBL inquiry unit, it would redefine the aims of education, and our classrooms would be collaborative workshops for a better world. We can see examples of the work students are doing to change the world through programs such as EL Learning's annual Better World Day. In 2021, more than 50,000 people participated.

Finally, consider what it would look like if an entire school adopted PBL, in every grade. It would transform a school into a PBL community that is a force for individual and collaborative transformation. From the moment you step into these schools, you would be surrounded by authentic, creative, beautiful, joyful, and world-changing student creations. You would see and feel this force all around you. The power and potential are limitless. It would be thrilling.

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