

SETTING THE STANDARD FOR PROJECT BASED LEARNING

A Proven Approach to Rigorous Classroom Instruction

by John Larmer, John Mergendoller, Suzie Boss

ASCD, 2015

I. Why Project-Based Learning

- PBL was meant to teach content, not just build “soft skills” as some stereotypes suggest
- Generally speaking, students are driven to learn by external factors, not the real “need to know” that is one of the keys to PBL’s motivational effect.
- Even though information on any topic is readily available in our digital age, people still need some background knowledge to be able to make sense of the information and to be well-rounded, culturally literate members of society. Learning key knowledge and understanding should always be one of the twin goals of a project, along with gaining key success skills.
- Contrary to some stereotypes, there is still room for lectures in PBL.
- Stanford University’s Design for Extreme Affordability and MIT’s D-Lab are multidisciplinary project based courses in which students develop products and services for the world’s poor.
- PISA: has begun offering a test of creative problem solving that measures students’ ability to respond to a non-routine situation.
- We have noted that many teachers who have entered the classroom in recent years, especially in the elementary grades, have not even had the opportunity to plan a unit. It has always been done for them.
- You can still have structure and use traditional instructional tools in a project-based approach. Students pay more attention to lectures when they see its purpose in the context of an engaging project.

II. What is Gold Standard PBL?

- Gold standard PBL
 - Projects are organized around the solution of a challenging problem or question
 - Projects reflect the experience and professional expectations of professional (authentic tasks)
 - Students have considerable voice and choice in deciding how they would solve problems and create models. Multiple correct answers are possible
 - Require revision in response to critique. It is through a process of rigorous assessment, critique, and revision that learners encounter the strengths and deficiencies of their initial ideas and efforts, add missing details and elaborate their products, recognize misunderstanding and finally deepen their learning.
 - Goal is to create a public product.
- Dewey: The danger that children undertaking too complex projects will simply muddle and mess, and produce not mere crude results (which is a minor matter) but acquire crude standards (which is an important matter) is great. (Dewey, 1916)
- In project-based learning, teachers are indispensable, for they create the context in which student learning takes place. The teacher’s job is to:
 - Design and plan projects, making sure they lead students to grapple with things worth knowing (generally defined by accepted standards)
 - Scaffold learning and materials so that students succeed
 - Assess student progress

- Engage and coach students toward learning goals
- Manage the project process, turning over as much responsibility to students as is productive, given the goals of the project and students' readiness to assume responsibility for their own learning.
- Engagement alone is not a sufficient justification for PBL, and learning in general.
- The distinction between problem-based and project-based learning is academic and possibly arbitrary.
- Howard Barrows: The oral statements and challenges the facilitator makes should be those he would make to himself when deliberating over such a problem or situation as the one his students are working with. His questions will give them an awareness of what questions they should be asking themselves as they tackle the problem and an appreciation of what they will need to learn. In this way he does not give them information or indicate whether they are right or wrong in their thinking.
- To crank up tension and interest, the teacher can ask Why? What do you mean? What is the evidence? Are there other explanations? Have you thought of everything that needs to be considered? What is the meaning of that?
- To decrease the challenge, the teacher can ask questions such as Should we just tackle a piece of this problem or task. Let's revise our objectives and tackle those that are most important in this task. Maybe we ought to stop here and get the big picture now and fill in the details later.
- Linda Torp and Sara Sage recommend that problem based teachers keep five activities in mind:
 - Diagnosing students' learning needs
 - Mentoring by helping students build intellectual bridges from their current understanding to more complete and complex understanding
 - Encouraging student progress
 - Questioning student thinking
 - Modeling the inquiry process
- Essential Project Design Elements
 - Challenging problem or question
 - Sustained inquiry
 - Authenticity
 - Student voice and choice
 - Reflection
 - Critique and revision
 - Public product
 - Key knowledge, Understanding and Success Skills at Center of Design
- Success skills represent learning goals for a project, and the processes necessary to achieve project goals.
- Success skills
 - Critical thinking/problem solving
 - Collaboration
 - Self-management
- Critical thinking/problem solving is foundational for innovation and creativity
- Communication is included in standards for reading, writing, speaking & listening
- Questions focus students' attention on what is important to be learned and help students distinguish between relevant and irrelevant information. They also can prompt students to activate their prior knowledge, which is a key part of the process of organizing new information and connecting it to what is already known.

- Elements that contribute to the challenge level of a problem or question
 - Difficulty of understand and applying the underlying information and concepts students will need to learn
 - Degree of structure found within the problem
 - Complexity of procedures and number of steps students will have to complete in order to solve the problem
- Process begins by asking what do we know and what do we need to know to solve the problem or answer the driving question.
- Inquiry – done well – is not the same as turning students loose to discover things to be learned. In project based learning, it is the project itself, carefully planned by the teacher, that structures student inquiry and guides learning activities toward project goals.
- Four ways to address authenticity
 - Context of a project can be authentic (e.g. create restaurant menus)
 - Tasks students complete and the tools they use, can make a project authentic if those tasks and tools match what people do in the real world
 - Impact on the world (e.g. presentation to the school board proposing redesign of playground)
 - Personal authenticity that speaks to students’ personal concerns, interests, or issues in their lives, or because they engage the needs, values, language and cultural practices of students’ communities.
- Projects that include multiple forms of authenticity are more powerful and productive than projects with less authenticity.
- Dewey: We do not learn from experience. We learn from reflecting on experience (1938).
- Reflection is two-pronged. Cast outward, it enables students to progress thoughtfully through project tasks and modify their behavior as needed. Cast inward, it provides awareness of the learning and problem-solving strategies they are using, and enables students to better understand and modify these strategies.
- John Hattie: Providing formative evaluation is the fourth most powerful influence in his list of 150 possible influences, more powerful than teacher-student relationships, prior achievement, or cooperative learning.
- Hattie: Students’ role is not simply to do tasks decided by teachers, but to actively manage and understand their learning gains. This includes evaluating their own progress, being more responsible for their learning, and being involved with peers in learning together about gains in learning.
- Critique and revisions is a normal part of product creation and is generally carried out through protocols or other structures process to ensure that the feedback is “specific, helpful and kind.”
- The teacher is a content expert, a mentor, a motivator, and an assessor of learning.
- Project Based teaching practices
 - Design and plan
 - Align to standards
 - Build the culture
 - Manage activities
 - Scaffold student learning
 - Assess student learning
 - Engage and coach
 - Key knowledge, understanding and success skills at center
- PBL encourages a growth mindset through cycles of critique and revision where students have the opportunity to improve their products and, in so doing, increase and deepen their learning.

III. What Does the Research Say About Project Based Learning?

- We could find no published evidence in K-12 studies that PBL students score lower on assessments than traditionally taught students.
- The students at Phoenix Park did not know more mathematics than the students at Amber Hill. Rather the students were able to use mathematics they did know.
- Some projects last several days; others take a semester.
- Finding: Teachers vary in their initial and continuing effectiveness using PBL and often report that PBL is challenging to implement. Teachers can improve their implementation skills and confidence with the support of peers, mentors, and school leaders. Once they become competent with PBL, most teachers see its value and want to continue using it.
- Finding: Although students are engaged by PBL, they need support and guidance, especially when new to PBL. Projects need to be carefully constructed with an eye to the requisite skills and knowledge students will need to have to be able to complete the project successfully.
- Studies show the importance of preparing students for PBL, and the need to design projects that both build on the knowledge students already possess and enable them to fill in their knowledge gaps as the project unfolds. In addition to teacher interaction and scaffolding, other students can be engaged in peer tutoring and discussion, and technology can be used to structure student inquiry. Projects that require specialized procedures (such as designing experiments, conducting interviews) or sophisticated cognitive operations (such as prioritizing questions, linking evidence and conclusions) must be planned with opportunities for students to learn these skills, preferably through instruction, modeling and practice
- Finding: PBL is aligned with current thinking about the nature of human learning and the necessary conditions to help students learn with understanding, retain what they have learned, and apply their learning to new contexts and situations.
- Finding: PBL is aligned with current thinking about maximizing student motivation and interest.

IV. Designing a Project

- A project, like a unit, lasts for at least a week, usually two or more, not just a day or two.
- A project has several learning goals, not just one or two like a typical lesson.
- A project contains within it multiple lessons, activities, tasks, and student assignments, and it requires a variety of resources.
- A project moves through phases, leading to a culminating activity – usually a presentation and an explanation of what has been learned.
- A teacher may decide during the course of a project to make additions or modifications more substantial than the typical minor adjustments made during some lessons.
- The trick is to plan your project so that it is not mapped to tightly, or you will take away student voice and choice. But it cannot be too loose, either, or you will risk the dangers of wasted time, misdirected student energy and failure to meet learning goals.
- **Dessert projects:** At or near the end of a traditionally taught unit of instruction, a teacher sometimes serves up a dessert project to students, almost as if it were a reward for slogging through the material. Dessert projects are typically seen as fun; the goal is not to teach the content or assess student learning, but to provide a “hands-on” experience.
- **Side dish projects:** This kind of project is similar to a dessert project but occurs during a traditionally taught unit or outside the bounds of units altogether. The goals are similar to those of a

dessert project, but with more emphasis on giving students a chance to study a topic in depth, with some degree of choice.

- **Buffet projects:** Some teachers design units in which students experience a number of varied activities, most of which are hands—on and fun as well as educational. The activities are united by a common theme, time, or place. The goals of buffet projects are similar to that of dessert and side dish projects: engage students and enrich the basic content of the unit.
- **End of unit performance assessments or applied learning tasks:** Teachers sometimes ask students to demonstrate what they have learned as the culmination of a unit and call the effort a project. The goal of such projects is mainly to assess student learning, and sometimes to allow students to experience a hands-on, enjoyable activity.
- These examples are not project based learning because they are not the main course. They are not thought of as the method of instruction in the regular classroom or school program, but as an addition to it. They are not the primary vehicles for addressing content standards. They do not replace a traditional unit or act as a major part of a unit, but are supplemental to traditional units – or even completely separate from what happens in the regular academic course or classroom.

Projects	Project Based Learning
Supplemental to a unit	The project is the unit, or a major vehicle for teaching content standards within a unit
Task is based on following directions from the teacher and is repeated year after year	Task is open-ended and involves student voice and choice; often differs from year to year
Typically done individually	Done in collaboration with a team
Done independently, often at home	Done with teacher guidance, much of it during school hours
Focused on the product, the product may even be called “the project”	The project includes a sustained inquiry process and the creation of a product
Not authentic to the real world or to students’ lives	Authentic to the real world or to students’ lives, or both

- Types of projects
 - Solving a real-world problem
 - Meeting a design challenge
 - Exploring an abstract question
 - Conducting an investigation
 - Taking a position on an issue
- **Design Step 1: Consider your Context**
 - Who is this for?
 - What are my goals
 - What is my time frame?
 - Who am I working with?
 - What are the parameters and constraints?
 - Which students will be involved?
 - When will I conduct the project?
 - How simple or complex will my project be?
 - How long will my project be?

- How many subject areas will be included?
- **Design Step 2: Generating an Idea for a Project**
 - Customize someone else's project
 - Evaluate it by asking the following questions:
 - Does it address the standards/content I need to target?
 - Is it main-course PBL, or only a “dessert” project?
 - Does it reflect Gold Standard PBL design criteria?
 - Will my students find it engaging?
 - Is the length and level of complexity appropriate for my students and me?
 - Can I conduct this, given my own expertise and the resources available to me?
 - How much would I need to do to adapt this project so it will work for my students and me?
 - Generate your own idea
 - Issues in your school or community
 - Current events
 - Real-world problems
 - Content standards
 - Students' lives and interests
- **Design Step 3: Building the Framework**
 - Set learning goals
 - Select major products
 - Does the product provide enough evidence that students have met the targeted goals for learning, or will I need a combination of products?
 - Is the product as authentic as possible?
 - Consider what people do in the world outside school. What products do they create?
 - Is the product feasible?
 - Will student teams create the same product or different products?
 - Decide how products will be made public
 - Put it to use in the real world
 - Give presentations to an audience, live or online.
 - Conduct an event
 - Display it in a public space
 - Publish, post or send it to someone
 - Write a driving question
 - Statement in student-friendly language of the challenging problem or question at the heart of the project
 - Some teachers write the question with their students near the start of a project to build a sense of ownership
 - Question should be engaging for students, open-ended, and aligned with learning goals
- A relatively simple project might take 8 to 10 hours of class time. More complex projects typically range from three to five weeks. Some very ambitious projects can take months, although not every minute of every class or day is devoted to project work.
- A project should be designed to teach two types of learning goals
 - Key knowledge and understanding

- Key success skills
- Reflections on design
 - Is the content to be learned important enough to spend this much time on?
 - Do the project idea, the learning goals, the major products and the driving question hang together?
 - Does the project seem appropriate and feasible, given your context and constraints?
 - Consider running the plan by students.

V. Managing a Project

- Are students ready?
 - Are students able to work well in teams?
 - Are your students used to instructional methods that mostly involve teacher-directed tasks, lectures, textbooks worksheets and getting the right answer?
 - Will your students be able to think critically, solve problems, find and evaluate information, brainstorm ideas, give and receive critique, and perform other complex cognitive tasks?
 - Do your students know how to use a particular technology tool you intend for the project, contact and interview an expert, and make a presentation?
- Create a project calendar and arrange resources
- Phases of project
 - Launching project
 - Building knowledge, understanding and skills
 - Developing, critiquing and revising products
 - Presenting products

What Students Think About	Project Path	How Teachers Support Inquiry
<ul style="list-style-type: none"> • What is the project asking me to do? • What do I need to know? • Why is this important? • Who will I be sharing my work with? 	<p>Phase 1 Launch Project:</p> <ul style="list-style-type: none"> • Entry Event • Introduce Driving Question • Generate list of Student Questions 	<ul style="list-style-type: none"> • Conduct entry event • Present or co-construct driving question • Facilitate process for generating student questions
<ul style="list-style-type: none"> • What resources can and should I use? • Can I trust the information I am finding? • What is my role in the process? 	<p>Phase 2 Build Knowledge, Understanding and Skills to Answer Driving Question</p>	<ul style="list-style-type: none"> • Facilitate use and evaluation of resources • Provide lessons, scaffolds, and guidance in response to student needs
<ul style="list-style-type: none"> • How can I apply what I have learned to the project? • What new questions do I have? • Do I need more information? • Is my work on the right track? 	<p>Phase 3 Develop and Critique Products and Answers to the Driving Question</p>	<ul style="list-style-type: none"> • Help students apply learning to project tasks • Provide additional experiences to generate new knowledge and questions • Facilitate processes for feedback

<ul style="list-style-type: none"> • What should I explain about my work? • How can I best share this with others? • What have I learned and what should I do in the next project? 	<p>Phase 4 Present Products and Answers to the Driving Question</p>	<ul style="list-style-type: none"> • Help students evaluate their work • Facilitate student reflection on process and learning
---	--	--

- Managing Phase 1
 - The first phase of a project typically lasts two or three class periods or hours for upper elementary and secondary students. For younger students, who might need more time to explore a topic and gain some context before focusing on a project, the first phase may take multiple days, depending on how much time per day is devoted to it.
- Phase 1 Events
 - Entry event is conducted
 - Driving question is introduced
 - List of student questions to be investigated is generated
 - Major product is discussed
 - Project calendar is explained
 - Initial team meetings are held, with team-building activities
 - Norms for teamwork and team contracts are discussed and written
 - Preliminary task lists are written
 - Individual activity logs or project journals are begun
 - Research, reading or other content-related work is begun.
 - An entry event is not a simple “hook” like what you would find in traditional lesson planning. It is more in-depth and usually longer, and it is meant to get students thinking, not just get their attention. A good entry event encourages students to access their prior knowledge about the challenging problem or question that is the focus of the project. Possible entry events:
 - Field trip
 - Guest speaker
 - Video or scene from a film
 - Provocative reading
 - Simulation or activity
 - Startling statistics
 - Puzzling problem
 - Real or mock correspondence
 - Lively discussion
 - Song, poem, art
 - Help students understand what a high-quality product looks like with rubrics and exemplars. Each major product in a project should have a rubric. Rubrics can be written before a project or you may construct one with students during a project. The best way to make sure students understand a rubric is to have them practice using it with an example of the kind of product they will create in the project.
 - The size of a project team can vary. Four-member teams are generally best for sharing the workload and for optimal group dynamics. This number also allows for doing some tasks in pairs.

- Managing Phase 2
 - Help students answer their questions by finding and using resources as independently as possible
 - Provide them with scaffolding – including direct instruction – if and when needed.
 - Monitor student teams as they work, and coach them or intervene as necessary.
 - Scaffolding or support for student learning can take many forms in a project. PBL does not simply turn students loose; it includes plenty of room for teach-provided lessons and materials, even lectures and direct instruction if warranted.
 - A teacher may be tempted to frontload a lot of support for students, but a key feature of PBL is that it creates an authentic “need to know” in students. They have more motivation to pay attention and retain information when they see an immediate purpose for learning.

Project Design: Student Learning Guide			
Project:			
Driving question:			
Final Products <ul style="list-style-type: none"> • Presentations, Performances, Products, and/or Services 	Learning Outcomes/Targets <ul style="list-style-type: none"> • Content and 21st century competencies need by students to successfully complete products 	Checkpoints/Formative Assessments <ul style="list-style-type: none"> • To check for learning and ensure students are on track 	Instructional Strategies for All Learners <ul style="list-style-type: none"> • Provided by teachers, other staff, experts; Includes scaffolds, materials, lessons aligned to learning outcomes, and formative assessments

- Have discussions early and often about what it means to work effectively as a team. Refer students to team contracts, rubrics, or other criteria the class has discussed.
 - Be sure your grading system relies mostly or entirely on individual work, not a team-created product.
- Managing Phase 3
 - Provide formative assessment
 - Formative assessment is one of the most powerful ways to improve student performance. Students need to be given feedback and opportunities to improve their performance and revise their work.
 - Use protocols for peer critique
 - Having students critique each other’s work in PBL is valuable for several reasons
 - It helps students learn how to work independently
 - It takes some of the burden off the time-crunched teachers
 - It serves an instructional purpose by helping students internalize the criteria for high quality work
 - It promotes critical thinking, collaboration, and communication skills
 - Grading
 - Do not give one grade for the entire project
 - Consider not grading a team-created final product or presentation
 - Evaluation, reflection, celebration

- Debrief the project
- Take a last look at the list of student-generated questions and the project's driving question
- Ask students to evaluate their performance
- Ask students to identify areas for growth
- Reteach or reinforce any key understanding or concepts that students might not have fully grasped
- Celebrate success

VI. Leading a PBL Implementation Effort

- Why do you want to see project based learning take hold in your school system?
- How well does your district culture reflect PBL principles, such as shared decision-making, inquiry, and authentic assessment? How might you improve the alignment?
- As an educational leader how do you model PBL practices such as collaboration, consensus building, problem solving, and effective communication?
- We suggest starting with a pilot PBL program before expanding the initiative.
- Teachers may be justly concerned about their workload if they are asked to do PBL on top of RtI, UbD and differentiated instruction.
- We started with teachers doing gallery walks, exhibiting student work, and having conversations with their peers.
- It may mean making choices about great ideas you will have to say “no” to. If you do engage in other initiatives, show how they connect to PBL.
- Create a PBL task force
- Teachers' professional development needs do not stop once they have taken part in an introductory workshop.
- School leaders who are comfortable with PBL tend to sit with students and ask them about their projects during teacher evaluation observations.
- If someone proposed combining measures of height, weight, diet, and exercise into a single number or mark to represent a person's physical condition, we would consider it laughable. How could the combination of such diverse measures yield anything meaningful? Yet every day, teachers combine aspects of students' achievement, attitude, responsibility, effort, and behavior into a single grade that is recorded on a report card and no one questions it.
- Report cards that distinguish among product, process and progress are useful.
- Action research? How will we know if PBL improves learning
- How will you help your staff avoid initiative burnout?



