Framework for High Quality Project Based Learning

Spring 2017 Draft

A Framework for High Quality Project Based Learning

The Need to Define High Quality Project Based Learning

Project Based Learning (PBL) is increasingly recognized as a powerful instructional approach, both in the United States and around the world. More and more educators are trying to use project-based methods to engage their students toward meaningful, deeper learning. Although Project Based Learning's popularity is heartening, its rapid growth is also cause for caution. Currently, there is no collectively-developed, widely-accepted Project Based Learning Framework to guide aspiring educators. This is a serious obstacle to quality PBL practice, placing instructors in the situation of workers building a house without specifications or a blueprint.

To remedy this situation, the Buck Institute for Education, a nonprofit organization dedicated to building the capacity of teachers, school leaders, and school systems to implement great projects with all students, is leading an iterative, input-rich process to articulate a common vision of High Quality Project Based Learning. Guided by a 27 member steering committee of education leaders from the U.S. and other nations, and informed by the perspectives and input of a 90 member advisory team, it will also employ a dedicated website to gather public comment and suggestions from educators worldwide. This input will lead to several cycles of critique and revision, and be informed by a review of relevant research. This document describes the content of the framework; after consensus has been reached on what should be included, a user-friendly version will be written and designed for teachers, school leaders, and other educators and organizations.

By combining a crowd-sourced development process with a research review, the project seeks to create a framework for High Quality Project Based Learning that will have wide adoption and influence on formal and informal education throughout the world. This framework will guide practitioners and can serve as the basis for PBL certification, professional development, and materials development by state departments of education and other organizations.

This effort could not be undertaken without the generous financial support of the Project

Management Institute Educational Foundation and the William and Flora Hewlett Foundation. Strategic advice is also being provided by Getting Smart, an educational advisory and advocacy service.

What is High Quality Project Based Learning?

Project Based Learning falls within the general boundaries of student-centered instruction – those ways of teaching and learning that emphasize what students are interested in, understand, and initiate, as opposed to teacher-centered approaches emphasizing the transmission of prescribed knowledge from instructor to learner. In so doing, PBL shares assumptions and techniques with other student-centered learning approaches such as personalized learning, internships, and service learning. At the same time, Project Based Learning has its own, unique aspects including an emphasis on sustained inquiry, project management, and the creation of a publicly-shared product. Students work to complete an extended project that engages them in solving a real-world problem or answering a complex question, and perhaps even making an impact on their community. PBL can be used with any age learner and in any subject area, and often introduces students to the perspectives, tools and concepts disciplines use to make sense of the world. Project Based Learning also allows students to learn about themselves, their strengths and challenges, and their own relationship to the world.

This general outline of Project Based Learning will seem familiar to many, but it does not address the question of what distinguishes *high quality* Project Based Learning from less successful implementations. This distinction will be refined over the course of this project, but thanks to the thought and creativity of the High Quality Project Based Learning steering committee, there is a starting point for review and critique. The framework below describes High Quality Project Based Learning according to four categories: the *principles* on which it rests, the *purposes* it seeks to achieve, the *processes* that contribute to student learning and growth, and the *products* that emerge. Within each of these categories, there are key components that will be described in more detail below. Other instructional approaches could be described using a similar four-category framework, but High Quality Project Based Learning is unique in the way it combines the components displayed below, and in the interplay between educational
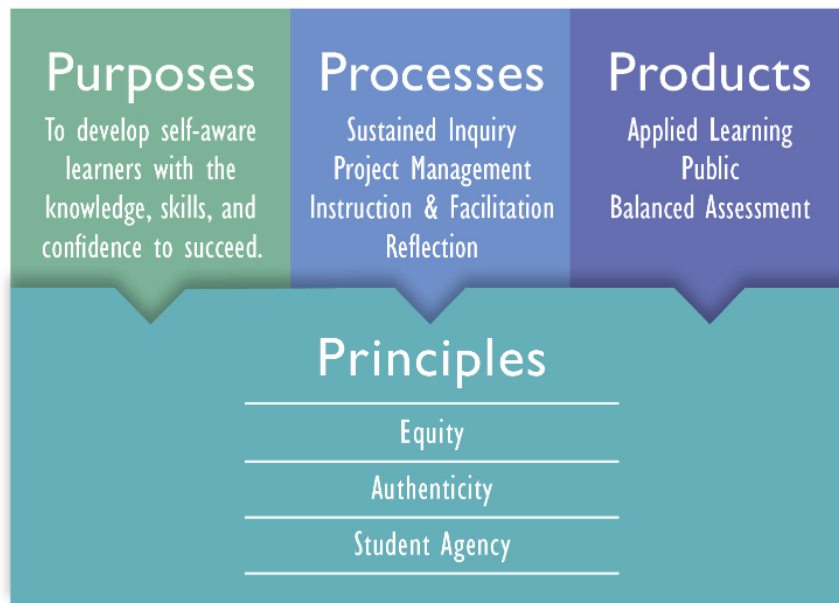
principles, processes, products, and purposes. This is the distinctive instructional signature of High Quality Project Based Learning.

The High Quality Project Based Learning Framework

The High Quality Project Based Learning Framework is not directly focused on practical project design—the concrete activities and tasks teachers and students do while creating and completing a project (conceiving a product, setting benchmarks, gathering resources, etc.). Similarly, it is not intended as a rubric to distinguish "good" and "bad" projects. There exist numerous publications, websites, and professional development organizations providing practical advice and useful examples for how to do Project Based Learning. Instead, this framework focuses on the concepts and aspirations that undergird High Quality Project Based Learning as an approach to instruction, and which must be addressed if PBL is to be considered high quality. The HQPBL Framework is the first step in developing a set of guiding questions that educators can use to assess and improve their own PBL implementation, or to develop new curriculum resources and professional development opportunities.

Framework Categories and Components

The categories and components of the HQPBL Framework are largely self-explanatory, but it may be useful to provide an overview of the framework as a whole, and then focus on individual components.

Purposes
To develop self-aware learners with the knowledge, skills, and confidence to succeed.

Processes
Sustained Inquiry
Project Management
Instruction & Facilitation
Reflection

Products
Applied Learning
Public
Balanced Assessment

Principles

Equity

Authenticity

Student Agency

Purposes

Most teaching methods seek to **build the knowledge, skills, and confidence** needed for learners to succeed in a complex and changing world, and this is also the overarching purpose of High Quality Project Based Learning. In addition to increasing the retention of knowledge[1] and acquisition of deeper understanding, projects provide multiple opportunities for students to build skills valuable in the modern workplace: critical thinking, problem solving, communication, collaboration, and creativity/innovation. Of equal importance, however, is the explicit attention given to fostering learners' personal and social development**,** to help them become **self-aware**, and acquire the confidence needed to undertake and prevail in new challenges.

Processes

High Quality Project Based Learning prioritizes **sustained inquiry**, encouraging learners to ask questions and delve deeply into the concepts and practical strategies necessary to bring a project to fruition. In this effort, **project management** is a key tool, optimally shared between learners and teachers for achieving project goals. Like other teaching methods, research-validated **instruction** is part of High Quality Project Based Learning. This is paired with **facilitation**, where teachers take pains to support students

and move them toward their goals through coaching and scaffolding. Throughout this learning process, time is given to both student and teacher **reflection** which provides opportunities for students to think deeply about the content they are learning, the skills they are developing, and the potential application of these skills and knowledge.

Products

Project Based Learning provides an opportunity for students to **apply their learning** by creating a display, performance, or construction that achieves project goals, and demonstrates learners' knowledge, skills, and understanding. This product is made **public** so that others may provide feedback, and contribute to product improvement. **Balanced assessment**, the combination of formative and summative assessment, given by students, the instructor, and the greater community, focused on understanding, project activities, and personal development – provides feedback both during the project and at its conclusion.

Principles

The principles of HQPBL are the core values of the framework; they guide the conceptualization and drive the implementation of projects. High Quality Project Based Learning is committed to **equity**, defined as the opportunity and support necessary for all students to be successful in the project. It also emphasizes **authenticity** by creating learning situations reflecting real-world issues and contexts. HQPBL strives to develop **student agency**, the internal sense that individuals can achieve their goals.

More details on the individual components of HQPBL are discussed below.

Processes

Sustained Inquiry. High Quality Project Based Learning defines inquiry as a disciplined process of asking questions and gathering data necessary to achieve project goals. Through inquiry, the act of seeking information becomes the foundation of meaningful learning.[2] Students confront problems and difficult tasks through an iterative approach of making meaning out of the information they have collected and determining if they

have answered their questions or need to ask new ones. In contrast to "hands-on activities," it is the project itself, carefully planned by the instructor (and at times, by the learners themselves) that structures student inquiry and guides learning activities toward project culmination.

The presence of inquiry, however, is not a sufficient marker of High Quality Project Based Learning. Inquiry must be *sustained*. By extending the project timeline, learners have the opportunity to grapple with significant conceptual and practical issues, and persevere in a productive struggle to achieve project goals.[3] Project teams go through developmental phases as well as emotional ups and downs. Learning the collaborative skills necessary to contribute to an ongoing team may take time. Finally, if students are to develop the self-management and project-management skills that will be useful in college, career, and life, then they must be able to manage themselves and others over the course of weeks, rather than days. High Quality Project Based Learning provides opportunities for sustained inquiry over multiple working sessions.

Project Management. HQPBL projects are not simply launched and allowed to unfold, with students working on their own, without a process for completing tasks. That would be a recipe for unfocused drift, wasted time, and frustration for students and teachers. In HQPBL, projects are managed. Not just teachers but also students take on the role of project managers, to the extent appropriate for their age and experience.

Teachers and students in PBL use project management[4] practices when designing a project; setting learning goals; organizing and accomplishing tasks; setting checkpoints and deadlines, monitoring progress and testing ideas; reflecting on what is being learned; and wrapping up the project by sharing products publicly and assessing the results.

Instruction and Facilitation. Although Project Based Learning rightly emphasizes the key role of the learner, the importance of the teacher is often neglected. HQPBL explicitly addresses the central role of the teacher, and the prominence of traditional

instructional practices as productive project activities. In addition to reading, writing, math, science, and other relevant academic subject content, many – if not most – projects require learners to develop specific skills. Some are practical (e.g., designing a survey, conducting an interview, using a measuring instrument, drawing a plan to scale), others are more conceptual (evaluating the reliability of a website, summarizing raw data using statistics, making suggestions for improving written work). Projects also often require students to develop new background knowledge (understanding the difference between federalism and states' rights, supply and demand, persona and author) to be completed successfully. There are different strategies students can use to develop these skills and knowledge, and it is part of effective teaching to determine when it is most appropriate for learners to master these on their own or to receive targeted instruction or scaffolding through lectures, practice exercises, selected readings or videos, and the like.

In High Quality Project Based Learning, the teacher also acts as a facilitator and coach, enabling students to work productively and providing emotional support and encouragement. As the project unfolds, teachers learn about students as individuals and show their respect for students' individuality and preferences. Teachers share students' accomplishments and listen to their frustrations as informed "guides on the side" who engage with students to advance thinking, working, and learning.

Reflection. In High Quality Project Based Learning, both learners and teachers need to reflect throughout the project on the effectiveness of their inquiry and project activities, the quality of work completed, and the obstacles to be confronted and overcome. HQPBL aims to prepare learners who, when confronted with a new problem, size it up and reflect on whether they've seen this type of problem before, and whether they've already developed knowledge and strategies they can use to address it.

When reflection is applied to one's own thinking processes (e.g., thinking about one's thinking), psychologists refer to it as metacognition. Cast outward, it enables students to progress thoughtfully through project tasks and modify their behavior as needed. This is often known as "self-regulation".[5] 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.

Products

Applied Learning. High Quality Project Based Learning is different from traditional instruction in that it emphasizes the active application of learning rather than the static acquisition of content. Project products provide opportunities for learners to demonstrate what they have learned, as well as what they can accomplish with these knowledge and skills. By testing new knowledge and skills through application, nuance is revealed, and knowledge and skills are deepened. These become more memorable and consequently, more accessible in the future.[6] The application process also enables learners to understand very concretely the worth of what they are learning, and how such knowledge and skills are used in the world outside of school.

Public. PBL provides the opportunity for students to create a product and share it with an audience beyond the classroom, when students display and describe their products in an exhibition, at a community meeting or other real-world setting, or online. This has several positive consequences. First, the products that result from a project are perceived as more real (i.e., authentic) and consequential than schoolwork that is only graded by the teacher and returned to students' notebooks. Since students tend to care more about work that will be made public and taken seriously by others, students are encouraged to do their best. Making project work public ups the stakes for both students and teachers.

By creating a product, students make what they have learned tangible and thus, when shared publicly, discussible. Instead of only being a private exchange between an individual student and teacher, the social dimension of learning becomes more important. This has an impact on classroom and school culture, helping create a "learning community," where students and teachers discuss what is being learned, how

it is learned, what are acceptable standards of performance, and how student performance can be made better.

Balanced Assessment. Assessment in HQPBL includes many of the practices found in traditional instruction, but it requires instructors to go beyond the assignments, quizzes, tests, and other tools with which they might be most familiar. Balanced assessment[7] emphasizes the need for both *formative assessment*—used to inform the learner and teacher about progress toward a learning goal—and *summative assessment*—used to make a judgment about what has been learned. Both are important in HQPBL.

Summative assessment in HQPBL, like formative, is a combination of traditional and, for many teachers, new practices. In a traditional curriculum unit, for example, a teacher might give a test or ask students to write an essay to determine whether they have learned what the teacher intended. In a project, those tools might still have a place—especially to assess content knowledge and conceptual understanding—but so does a final evaluation of a team-created product and of students' ability to employ critical thinking/problem solving, collaboration, and project management skills.

In addition to formative and summative assessment, other kinds of "balance" apply in HQPBL. A project should include self-assessment, in which students use evidence and reflection to evaluate their own progress and achievements. Peer assessment plays a role in evaluating the quality of a piece of work or one's participation as a member of a team. In addition to assessing individual work, teachers in a project-based classroom might need to assess the work done as a group. Because a project requires students not only to gain knowledge but to apply it, traditional measures of knowledge gained must be balanced with performance assessment.

Principles

Equity. Educational equity means that each child receives what he or she needs to develop to his or her full academic and social potential.[8] High Quality Project Based

Learning is essential for a complete and effective education; therefore, in order to promote equity, each child (or learner) should have access to it. HQPBL should not be reserved only for students who are high-achieving (or low-achieving), or who gain access to it only in special programs or special schools, or by chance enrollment in a particular teacher's class. All students benefit from acquiring the deeper learning and success skills that can be taught so effectively by HQPBL.

HQPBL promotes equity by holding all students to the same high expectations for project products, an ethic that is reinforced by shared norms and accountability. Moreover, it fosters an equitable environment when students' interests, cultures, and identities are valued to inform the issues and problems projects focus on—and when students' unique gifts and talents are recognized and leveraged to improve project work.

A great project has a powerful effect on students that can help them reach their potential, and can even be transformative for young people. This is especially important for students farthest from educational opportunity. A project that makes a real-world impact can give students a sense of agency and purpose; they see that they can make a difference in their community and the world beyond it. An authentic project provides opportunities, for students who might not otherwise be exposed to them, to visit real-world settings, interact with professionals in the workplace, and develop a passion or career interest.

Authenticity. PBL educators know that authenticity enhances students' engagement in projects. Authenticity not only increases motivation, but it can also increase achievement.[9] Authenticity is a complex concept, but it's generally synonymous with making a learning experience as "real" as possible. Teachers and students can make projects authentic in multiple ways, and in varying degrees.

First, projects can have an actual *impact* on the world, as when students make a presentation to the school board proposing the redesign of a school playground, write books and create a tutoring program for younger readers, design and sell note cards

picturing native animals to raise money for a local wildlife sanctuary, or conduct research projects and submit data that will be used by scientists to better understand climate change. Second, the *context* of a project can be a simulation or reflection of what happens in the world outside of school, even if students are not actually working in the real world—for example when elementary students design and create their own restaurant menus in a project, or when high school students act as advisors to the president on economic or social policies. Third, the *tasks, tools, processes, and performance standards* that students use make a project authentic when those things reflect what people do in the world outside school or the workplace. For example, students in some PBL projects today follow the process of "design thinking" used by professionals who design products and services. Finally, projects can have a *personal* authenticity because they speak to students' personal concerns, interests, or issues in their lives, or because they engage the needs, values, language, and cultural practices of students' communities.

Student Agency. Student agency is synonymous with experiencing control, autonomy, and power. It is exercised when students make decisions that affect their learning, including the way in which they learn, what they learn, and the pace at which they learn. Higher levels of student agency are associated with greater engagement and commitment to the learning process.[10] Students vary in their readiness to take on certain responsibilities and challenges, and teachers must determine how much autonomy is appropriate for each student. As a principle of High Quality Project Based Learning, however, the general goal is to help students reach the highest level of student agency they are capable of achieving. With a sense of agency, students are more likely to welcome and address new challenges, including issues in their own lives and communities.

An aspect of agency is holding a growth mindset, in which students' skills, knowledge, and interests can be developed through hard work, support and guidance, and effort. Students with a growth mindset build confidence, rebound from setbacks, and are willing to put in the time and effort it takes to make projects successful.

References

[1] Bransford, J. D., Brown, A. L., & Cocking, R. (Eds). (2000). *How people learn: Brain, mind experience, and school*. Washington, DC: National Academy Press.

[2] Bruner, J. S. (1966). *Toward a theory of instruction*. Cambridge: Harvard University Press.

Hmelo-Silver, C. E., Duncan, R. G., & Chinn, C. A. (2007). Scaffolding and achievement in problem-based and inquiry learning: A response to Kirschner, Sweller, and Clark (2006). *Educational psychologist*, *42*(2), 99-107.

[3] National Council for the Teaching of Mathematics. (2014). *Principles to Actions: Ensuring Mathematical Success for All*. Reston: NCTM.

[4] Project Management Institute Educational Foundation. (2014) *Project Management Toolkit for Youth*. Newtown Square: PMIEF.

[5] Bjork, R. A., Dunlosky, J., & Kornell, N. (2013). Self-regulated learning: Beliefs, techniques, and illusions. *Annual review of psychology*, *64*, 417-444.

[6] Bransford, J. D., Brown, A. L., & Cocking, R. (Eds). (2000). *How people learn: Brain, mind experience, and school*. Washington, DC: National Academy Press.

[7] Burke, K. (2010). *Balanced Assessment*. Bloomington: Solution Tree.
Stiggins, R. (2005). From formative assessment to assessment for learning: A path to success in standards-based schools. *Phi Delta Kappan*, 324-328.

[8] National Equity Project

[9] Blumenfeld, P. C., Kempler, T. M., & Krajcik, J. S. (2006). Motivation and cognitive engagement in learning environments. In R. K. Sawyer (Ed.), *Cambridge handbook of the learning sciences.* New York: Cambridge University Press.

Hickey, D. T., Moore, A. L., & Pellegrino, J. W. (2001). The motivational and academic consequences of elementary mathematics environments: Do constructivist innovations and reforms make a difference? *American Educational Research Journal*, *38*(3), 611-652.

[10] Brophy, J. (1987). Synthesis of research on strategies for motivating students to learn. *Educational leadership*, *45*(2), 40-48.