

# Project-Based Learning Research Review

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*What the research says about aspects of project-based learning ranging from implementation to learning outcomes.*

Studies have proven that when implemented well, project-based learning (PBL) can increase retention of content and improve students' attitudes toward learning, among other benefits. Edutopia's PBL research review explores the vast body of research on the topic and helps make sense of the results.

## What Is Project-Based Learning?

PBL hails from a tradition of pedagogy which asserts that students learn best by experiencing and solving real-world problems. According to researchers (Barron & Darling-Hammond, 2008; Thomas, 2000), PBL essentially involves the following:

- students learning knowledge to tackle realistic problems as they would be solved in the real world,
- increased student control over his or her learning,
- teachers serving as coaches and facilitators of inquiry and reflection, and
- students (usually, but not always) working in pairs or groups.

Teachers can create real-world problem-solving situations by designing questions and tasks that correspond to two different frameworks of inquiry-based teaching: problem-based learning, which tackles a problem but doesn't necessarily include a student project, and project-based learning, which involves a complex task and some form of student presentation, and/or students creating an actual product or artifact.

These inquiry-based teaching methods engage students in creating, questioning, and revising knowledge, while developing their skills in critical thinking, collaboration, communication, reasoning, synthesis, and resilience (Barron & Darling-Hammond, 2008). Although these methods of inquiry-based teaching differ slightly, for simplicity they're combined in these pages and referred to as project-based learning or PBL.

## Learning Outcomes

Studies comparing learning outcomes for students taught via project-based learning versus traditional instruction show that when implemented well, PBL increases long-term retention of content, helps students perform as well as or better than traditional learners in high-stakes tests, improves problem-solving and collaboration skills, and improves students' attitudes toward learning (Strobel & van Barneveld, 2009; Walker & Leary, 2009). PBL can also provide

an effective model for whole-school reform (National Clearinghouse for Comprehensive School Reform, 2004; Newmann & Wehlage, 1995).

A 2016 MDRC/Lucas Education Research literature review found that the design principles most commonly used in PBL align well with the goals of preparing students for deeper learning, higher-level thinking skills, and intra/interpersonal skills (Condliffe et al., 2016).

## **Keys to Project-Based Learning Success**

Researchers have identified several components that are critical to successful PBL (Barron & Darling-Hammond, 2008; Ertmer & Simons, 2005; Mergendoller & Thomas, 2005; Hung, 2008). While project-based learning has been criticized in the past for not being rigorous enough, the following features will greatly improve the chances of a project's success.

1. A realistic problem or project that aligns with students' skills and interests and requires learning clearly defined content and skills (e.g., using rubrics, or exemplars from local professionals and students).
2. Structured group work with groups of three to four students, with diverse skill levels and interdependent roles; team rewards; and individual accountability, based on student growth.
3. Multi-faceted assessment, with multiple opportunities for students to receive feedback and revise their work (e.g., benchmarks, reflective activities); multiple learning outcomes (e.g., problem-solving, content, collaboration); and presentations that encourage participation and signal social value (e.g. exhibitions, portfolios, performances, reports).
4. Participation in a professional learning network, including collaborating and reflecting upon PBL experiences in the classroom with colleagues, and courses in inquiry-based teaching methods.

## **Annotated Bibliography:**

<https://www.edutopia.org/pbl-research-annotated-bibliography>