

PROJECT-BASED LEARNING RESEARCH BRIEF

Afterschool programs offer a wide range of opportunities for youth. They have the potential to support students' academic growth and positive development while also helping them develop important 21st century skills such as critical thinking and problem solving. For out-of-school time providers, the challenge is how to design learning experiences that deliver on this promise.

This research brief examines the benefits of an instructional approach known as project-based learning. This approach engages youth in deep and meaningful learning through inquiry-driven experiences. During projects, students work in teams to investigate questions and solve real-world problems. At the conclusion of a project, students showcase and reflect on what they have learned, designed or discovered.

A Framework for Active Learning

Project-based learning belongs to a family of instruction that uses open-ended questions or problems as the entry point for active learning. With subtle differences in practice, these methods may be called project-based, problem-based, inquiry-based, challenge-based or design-based learning. Service learning incorporates similar methods but with the additional goal of addressing community concerns or giving to others. Despite the variations, these inquiry-driven approaches can be considered "close cousins" with many similarities and common benefits (Barron & Darling-Hammond, 2008; Ravitz, 2009).

In a meta-study of project-based learning, Thomas (2000) found five defining characteristics of this approach. Projects are central to the curriculum, not add-ons to serious study. Projects focus on driving questions that lead students to encounter important concepts and content. Students take part in investigations that allow them to build their understanding. Students have more responsibility for their own learning than in traditional, teacher-driven instruction. Projects relate to the real world.

With these elements as the framework for active learning, students are able to apply what they learn to new contexts. Students learn more deeply if they take part in activities that ask

them to apply knowledge to real-world problems (Barron & Darling-Hammond, 2008).

Academic Benefits

Project-based learning aligns with rigorous, standards-based educational goals (Darling-Hammond et al., 2008; Ravitz, 2009; Ravitz et al., 2004; Thomas, 2000). Students master core content at least as well through projects as through more traditional instruction (i.e., relying on textbooks, lectures and tests). However, project-based learning yields additional benefits such as increased motivation and improved attitudes toward learning (Thomas, 2000). Similarly, researchers have found problem-based learning to be more effective than traditional instruction for long-term retention, skill development, and satisfaction of both students and teachers (Strobel & van Barneveld, 2009).

In studies focused on the use of project-based learning to teach specific subjects, students have demonstrated deeper understanding and higher achievement when using projects to learn about math, science and technology (Boaler, 2009; Geier et al., 2008; Thomas, 2000). In one study, high school students who took a project approach to learning economics scored at least as well on Advanced Placement tests as those who learned through more traditional methods. In addition, students in the project-based learning

group scored significantly higher than the control group on problem-solving skills and their application to real-world economic challenges (Finkelstein et al., 2010).

Despite these promising academic outcomes, project-based learning is not appropriate for teaching basic skills such as reading or computation (Markham, Larmer, & Ravitz, 2003). It does, however, create an environment in which students can apply these skills to deepen their understanding.

Projects also offer opportunities for interdisciplinary work. Like real-life problems, interdisciplinary projects cut across disciplines and draw on multiple perspectives. When students engage in interdisciplinary study, they show increased understanding, appreciation of diverse viewpoints, ability to think critically and ability to transfer information to novel problems (Mathison & Freeman, 1997).

21st Century Skills

Project-based learning offers a strategy to build students' higher-order thinking skills and prepare them for the complexities of life and work in the 21st century. Research shows that projects help students develop the capacity to solve problems, think critically and plan effectively (Birmingham et al., 2005; Darling-Hammond et al., 2008; Mergendoller et al., 2006; Thomas & Mergendoller, 2000). Elementary students who took part in a nine-week social studies project, for example, outscored a control group on a test of critical thinking and also had more confidence in their own learning (Barron & Darling-Hammond, 2008).

Teamwork and collaboration skills have been identified as critical to 21st century success (Partnership for 21st Century Skills, 2009). Yet cooperative learning can be challenging to implement effectively, despite solid research

about the benefits of students working together. Project-based learning gives students opportunities to hone their collaboration skills by working together for a specific purpose and sharing responsibility for project success. Having students take on well-defined roles within project teams, another hallmark of project-based learning, is also associated with effective group work (Barron & Darling-Hammond, 2008). Through team participation, students learn how to resolve conflicts and overcome obstacles, preparing them for the inevitable challenges of real life.

Engaging All Learners

High levels of engagement for learners of varied ability levels and from diverse backgrounds have been cited in several studies about the effectiveness of project-based learning (Darling-Hammond et al., 2008; Ravitz, 2009; Thomas, 2000). The Challenge 2000 Multimedia Project used a model of project-based learning combined with technology. It found increased student engagement, greater responsibility for learning, increased peer collaboration skills, and greater achievement gains by students who had been labeled low achievers (Penuel, Means, & Simkins, 2000). Students who struggle in traditional instructional settings may excel when working on a project, where the setting better matches their learning style (Barron & Darling-Hammond, 2008).

Through project-based learning, youth frequently explore issues in their own communities, and this makes learning more relevant and connected to students' lives. Students may also work with mentors who provide expertise and offer positive adult role models. These factors offer additional benefits to youth by promoting healthy development (Benson, et al., 2004; Search Institute, 1997).

Service-Learning Projects

Project-based learning shares many features with high-quality service learning. Service learning achieves best results when it includes active and meaningful leadership roles for youth, structured reflection, clear learning goals and connections to real-world issues (RMC Research, 2007).

Studies have shown evidence of a range of benefits from service learning. These include improved attendance, higher grade-point averages, enhanced preparation for the workforce, enhanced awareness and understanding of social issues, greater motivation for learning, and heightened engagement in prosocial behaviors (Furco, 2007). After taking part in service-learning projects, students in one study were more likely to view social or community problems as systemic rather than personal; they became more action oriented in their solutions and proposed more solutions, and more realistic, solutions (RMC Research, 2007).

Challenges and Implications

Project-based learning offers opportunities for engaged learning, but is not without challenges. This instructional approach tends to be most successful when coupled with professional development for staff, so that teachers have time to get comfortable in the role of project facilitator rather classroom expert (Barron & Darling-Hammond, 2008; Thomas, 2000). When successfully implemented, project-based learning enhances professionalism, collaboration and satisfaction among teachers. (Finkelstein et al., 2010; Thomas, 2000).

Evidence supports the benefits of project-based learning during the regular school day, and there is a growing movement to incorporate project-based learning into school redesign. However, there is not yet a comparable research base about project-based learning in afterschool and other informal learning settings.

Overall, however, the evidence suggests that project-based learning addresses and enhances academic enrichment, problem solving and critical thinking. Thus it aligns well with the goals of 21st Century Community Learning Centers.

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