ABSTRACT

Project method, popularized by William Heard Kilpatrick, has seen resurgence in 21st-century education under the auspices of project-based learning. This chapter first presents a short biography of Kilpatrick to highlight experiences influencing his writing of the popular essay, “Project Method.” After providing a synthesis of Kilpatrick’s project method, which includes the thoughts of critics at the time, more current and prominent types of project-based learning are discussed. Research and critiques of project-based learning are also offered, concluding with a summary of the transformation of project method to its contemporary, project-based learning.

A current trend in education involves the growing movement of project-based learning classrooms, whose roots in the U.S. date back to early progressive educators. In the early 18th century, European architectural and engineering students’ final exams consisted of solving real and practical problems. This concept of learning through projects by solving practical problems was then introduced at the end of the 19th century in manual training and industrial arts high schools and elementary schools (Knoll, 2010, 2012). Learning by projects was promoted by conservative educators and gained the support of Congress, with the Smith-Lever Act of 1914 making considerable funds available for newly established vocational schools to implement learning-by-projects curricula. According to the U.S.
Bureau of Education, by 1915, 80 percent of schools taught manual training and 60 percent taught agricultural education using projects (Knoll, 2010; Monahan & Lane, 1915; Park & Harlan, 1916). Enthusiasm spread further in 1918 with the publication in *Teachers College Record* of William Heard Kilpatrick’s 18-page essay “The Project Method,” fully titled “The Project Method: The Use of the Purposeful Act in the Educative Process,” which went on to sell 65,000 copies (Knoll, 2012).

WILLIAM HEARD KILPATRICK: AN EARLY PIONEEER OF PROJECT-BASED LEARNING

Born and raised in White Plains, Georgia, in the midst of Reconstruction in 1871, Kilpatrick’s early schooling was conventional for the time (both traditional and, at times, boring). In 1888, at the age of 17, he entered Mercer University in Macon, Georgia, where he received a mix of acceptable and inferior teaching and learned how not to teach from poor examples of instruction (Beineke, 1998; Tenenbaum, 1951). After graduating from Mercer, Kilpatrick attended the Johns Hopkins University in Baltimore, Maryland, where free-inquiry learning became a transformational intellectual experience.

Kilpatrick returned to the south to begin a high school co-principalship in Blakely, Georgia, for teaching and curriculum oversight and to attend summer classes at Rock College Normal School in Athens, GA. During this time, a colleague recounted a story of leaving his students briefly unattended one day when a visitor entered the classroom to find students so engaged in their lesson as to be working without supervision. Kilpatrick credited this suggestion as the impetus of project method (Beineke, 1998). Also impactful during this time was a trip to Albany, Georgia, to hear Colonel Francis Parker speak about providing a sense of experience in education.

The years from 1896 to 1906 were influential to Kilpatrick’s philosophy of education. While holding several positions, including seventh-grade teacher, elementary school principal, professor of mathematics, and eventually vice president at Mercer, he began to explore the new field of educational studies, reading Herbert Spencer (e.g., *Education: Intellectual, moral, and physical*) and William James (e.g., *Talks to Teachers*) (Beineke, 1998). During the summer of 1898, he attended a summer school session at the University of Chicago and took a course from John Dewey. Two summers later while taking a course by Charles DeGarmo at Cornell University, Kilpatrick was persuaded of the value of student interest and the importance of individual interest as the starting point in education. Six years after that, he taught summer session at the University of Tennessee and audited classes from Percival R. Cole and Edward L. Thorndike, both Teachers College
faculty (Beineke, 1998). On the advice of Thorndike, Kilpatrick entered Teachers College, Columbia University, where he earned his PhD in 1912 and spent the remainder of his professional career, eventually being promoted through the ranks to emeritus professor.

Early career experiences inspired Kilpatrick’s perspective on the potential of projects in the classroom. For Kilpatrick, projects connected student learning to interactions with social and physical environments that piqued student interest (Beyer, 1997; Pecore, 2009). By intertwining activities of school and community with a goal of socially minded development, students are equipped to become participating and contributing members of a democratic society (Pecore, 2009; Tenenbaum, 1951).

**Kilpatrick’s Project Method: Anecdotes and Explication**

One project method story shared by William Heard Kilpatrick and recounted by Samuel Tenenbaum (1951) was about an eighth-grade boy who shared a magazine article with his class on how the Boston Massacre was false. The students in the class proceeded to investigate the claim by reading 14 history books. All but four of the books, which were more cautious in their interpretation, gave the same account, and the students became perplexed as to which stories were correct and how historians know of the events. The students then wrote all of the authors but received no reply. They wrote a second letter explaining how sincere they were in finding an answer. A few authors replied, including one of the more guarded ones, who explained where to find the small amount of primary source information that exists. The students found the source and concluded that while most of the books embellished the story, the facts supported more than the magazine article claimed. Later that year a student brought in a newspaper article reporting that Mrs. Berger, a candidate for school board reelection, was against interschool athletic competition. The students were upset until one girl reminded them of the Boston Massacre. The class decided to investigate by contacting Mrs. Berger, who subsequently denied the allegations, explaining that City Hall records would show that her previous votes were in favor of athletic programs. A group of students went down to City Hall and verified that Mrs. Berger was being truthful and that the newspaper printed false statements. The students and their parents proceeded to campaign for Mrs. Berger, who was reelected.

The project method example of the Boston Massacre illustrates progressive education in practice by involving students in meaningful learning opportunities connected to the world in which they live. Project method links purpose and democracy. While Kilpatrick readily admitted that he neither coined the
term “project” nor its application to education, he sought to clarify and defend the use of projects in education (Kilpatrick, 1918). For Kilpatrick, the project should represent a wholehearted purposeful activity of the worthy life in a democratic society, and thus the project or purposeful act is considered as life itself and not preparation for later living. Kilpatrick’s project method was influenced by John Dewey’s writings and by Edward L. Thorndike’s psychology of learning. Accordingly, Kilpatrick advocated for student-initiated projects that utilize the laws of learning to intrinsically motivate the student to emerge with a high degree of skill and knowledge, view school activity with joy and confidence, and appreciate school and other social agencies. He cautioned against student-coerced projects where the extrinsically motivated student obtains fleeting skill and knowledge, views school as a bore, and considers teachers, school, and social agencies as instruments of suppression (Kilpatrick, 1918). For Kilpatrick, project method’s greatest strength is the potential for building moral character, with students acting in pursuit of a rich variety of purposes, individually or collectively, under the supervision of a skilled teacher to help guide students to make increasingly finer discriminations of right and proper ideas and judgments. Ideally, the democratic teacher will gradually remove himself or herself from the educative process (Kilpatrick, 1918).

Kilpatrick (1918) offered a broad conception of project method. He identified four types of projects with procedures: Type 1 projects embody some external idea or plan; Type 2 involve enjoying an esthetic experience; Type 3, problem solving; and Type 4 involve obtaining a certain item of skill or knowledge. Examples of Type 1 projects include building a boat, writing a letter, or presenting a play. A four-step process (purposing, planning, executing, and judging) is suggested for Type 1 projects. Type 2 projects involve enjoying an esthetic experience, such as listening to a poem, hearing a symphony, or appreciating a painting. Projects of Type 2 were not fully realized by Kilpatrick, and thus he offered no specific procedure or process for Type 2 projects. Kilpatrick labelled the solving of some problem as Type 3 projects. Examples of intellectually difficult problems that define Type 3 projects include interpreting the effects of war or findings of an experiment. Dewey’s (1910) reflective thinking suggests a series of logical, rational steps or process based on the scientific method of defining, analyzing, and solving a problem for Type 3 projects as follows: 1) identify and define the problem, 2) determine the hypothesis or reason why the problem exists, 3) collect and analyze data, 4) formulate conclusions, and 5) apply conclusion to the original hypothesis. Type 4 projects involve obtaining a certain item of skill or knowledge. Examples of Type 4 projects include learning grade-appropriate writing or conjugation of verbs. The four-step process (purposing, planning, executing, and judging) suggested for Type 1 projects is also applicable for Type 4 projects, with the planning left to specific learning strategies.
Kilpatrick (1918) cautioned against the over-emphasis of Type 4 projects and the discrimination of a project drill from a set task, warning that the results will be markedly different. Key to project method success is the skilled teacher guiding the student through the process such that the student takes as much ownership as possible over each step so as to provide a healthy level of stress but prevent discouragement from too great a level of difficulty. In this sense, the responsibility of the teacher is to build bonds between students (Beineke, 1998).

Critics of Kilpatrick’s project method point out that his definition of the project was ambiguous and not a method. Kilpatrick broke from tradition by redefining the project from the more precise “independent constructive activity” to “whole-hearted purposeful activity,” which infuriated some (Knoll, 2010, 2012). However, the strongest concern was in Kilpatrick’s idea of a student-determined project. His friend and colleague, John Dewey (1981; Knoll, 2010), remarked that allowing the child to decide the learning process was impossible. For Dewey, Kilpatrick and his supporters were confusing the means and the aim by failing to realize that thinking was achieved through the leadership of the teacher to promote the student’s ability to think and not through providing the student with the freedom to self-direct. Dewey, unlike Kilpatrick, did not view the teacher-lead project as a means of suppression (Knoll, 2010).

**PROJECT METHOD IN THE 21ST CENTURY: PROJECT-BASED LEARNING**

A resurgence of project method has taken root in the 21st century under the auspices of project-based learning (PBL). While a single accepted definition for PBL does not exist, the Buck Institute for Education (BIE) does offer a concise standards-focused definition, broad in scope. According to the BIE (Markham, Larmer, & Ravitz, 2003), project-based learning is “a systematic teaching method that engages students in learning knowledge and skills through an extended inquiry process structured around complex, authentic questions and carefully designed products and tasks” (p. 4). Implementing a project or activity is not enough to be considered project-based learning unless five definitive features are met. The essential features of PBL include 1) a central project; 2) a constructivist focus on important knowledge and skills; 3) a driving activity in the form of a complex question, problem, or challenge; 4) a learner-driven investigation guided by the teacher; and 5) a real-world project that is authentic to the learner (Barron & Darling-Hammond, 2008; Thomas, 2000).

Similar to how project method was grounded in Thorndike’s psychology of learning, PBL is grounded in constructivist learning theory influenced by the work of early-20th-century psychologists Jean Piaget, Lev Vygotsky, and Jerome
Bruner. Constructivism is the philosophical view that knowledge is individually constructed, transmitted by interaction with the environment, and socially developed (Crotty, 1998; Savery & Duffy, 1995). Individually constructing knowledge involves cognitive conflict as a stimulus or goal for learning. Learners bring personal experiences with them into the classroom, which have a tremendous impact on how they view the world. Therefore, constructivists reason that learning begins with the prior knowledge, feelings, and skills students bring with them to learning situations (Schulte, 1996). The stimulus provides initial activation of prior experiences, a reason for engaging in the learning environment, and, thus, the understanding the learner eventually constructs. Learners then test the degree (i.e., evaluate the validity) to which their individually constructed understandings are compatible with other understandings or alternative views provided by the social environment (Savery & Duffy, 1995). Thus, learners build up their knowledge with experiences that they use to support their understanding. Teachers assist learners by assessing how students are constructing knowledge and by providing guidance through cognitive tribulations (Schulte, 1996).

A diversity of learning features combined with the lack of a universally accepted PBL model provides for a broad interpretation of PBL that is reminiscent of Kilpatrick’s project method. A number of X-based learning approaches (i.e., case-based learning, community-based learning, game-based learning, passion-based learning, service-based learning, team-based learning) that fit into the general category of PBL have emerged over recent years. Five most prominent types of PBL include challenge-based learning, problem-based learning, place-based learning, activity-based learning, and design-based learning.

Challenge-Based Learning

Challenge-based learning encourages student use of technology to solve real-world problems by engaging in a multidisciplinary approach to teaching and learning over an extended period of time. A challenge-based learning curriculum often focuses on global challenges with local solutions. The Ambition program created by the National Flight Academy, the University of West Florida’s Innovation Institute and TEQ Games is one example of a challenge-based learning curriculum. The immersive-inspired-play Ambition program is set in the context of a story on a naval aircraft carrier and integrates social studies, math, science, and language arts concepts into missions that require the technology of flight simulators and air traffic control and challenges students to apply their knowledge to solve real-world problems. Learners are provided with the knowledge and skills necessary for navigation using latitude and longitude, time-distance-rate calculations, and
unit conversions to develop flight plans, interpret radar signals, and establish mission command and control communications. Missions increase in complexity and seriousness over time, from initial flight familiarization to environmental impact missions to large-scale rescue operations challenging learners to apply knowledge and skills. While not a requirement for challenge-based learning, the Ambition curriculum includes aspects of game-based learning, where students play a type of game with defined learning outcomes. Most game-based learning applications involve drawing students into a virtual environment through computer simulations that look and feel real.

Problem-Based Learning

Problem-based learning is an instructional approach that presents students with solving ill-structured (open-ended) problems, usually in the form of case studies. The modern approach to problem-based learning is credited to Canadian medical schools that used case-study teaching involving real patient problems. This classical approach defined problem-based learning as small permanent groups of students working with an instructor on a new case approximately every three class meetings. On the first day, the group receives a new case and begins to analyze the preliminary data. With instructor assistance, the group decides on the issues to be addressed and distributes the research workload. When the students return the next day, they share their analysis, receive additional information, and continue their search. The third class meeting brings closure to the case when groups pull together their knowledge and prepare a final report. This classical definition of problem-based learning has been redefined and modified in various ways for different courses (Herreid, 2003; Pecore, 2009). Most often, cases provide the ill-structured driving problem to be solved by students through an open-inquiry method of instruction with multiple possible answers. In this way, problem-based learning differs from case-based learning, a more structured guided inquiry approach to solving a case.

Place-Based Learning

Place-based learning immerses students in authentic work within the local community, emphasizing a service-learning component connected to the local heritage, culture, landscape, and so forth, as the foundation for the subject or subjects being studied. As an example place-based learning event, students could create a civil rights journey through their city. Students are first immersed in the local community by preparing for and then collecting narratives of people’s experiences during the civil rights era through recorded interviews. Interviews are then placed
into context, edited, and produced by students into a short recording. For the service-learning component, recordings can be placed on civil rights buildings around the city for visitors to play and develop a deeper understanding of the civil rights era from personal experiences of local community members. Other examples of place-based learning projects include building a community garden and donating the food to a local food pantry and studying the local ecology and clearing a park of nonnative species.

Activity-Based Learning

Activity-based learning provides a physical (hands-on) and mental (minds-on) approach for students exploring a subject through experiments and activities involving the manipulation of tools and materials in performance of a real-work task. Activity-based learning is popular in India, especially in elementary schools. A typical sequence of activity-based learning begins with an introduction that might include a demonstration, distribution of resources, followed by an experiment or activity, and finally review/debrief/closure to end the lesson. As an example activity-based learning event, students are introduced to the topic of the relationship between exercise and health with a demonstration on how to calculate pulse rate. Students are then provided with the materials necessary to design and conduct an experiment such as determining the relationship between exercise and pulse rate. The lesson concludes with a discussion of student data, findings, and conclusions.

Design-Based Learning

Design-based learning invites students to actively engage in the task of designing or redesigning a product or system or creating a physical object connected to the curriculum with the purpose of enhancing creativity. According to Wijnen (2000), design-based learning is a concept from technical or industrial education where students actively work together on multidisciplinary design tasks to gain qualifications as creative professionals. They analyze technical systems and make assessments based on quality, functionality, and cost in order to design new products and enhanced systems. Types of design tasks include prototyping a recyclable lunch tray, a durable cost-effective two-way radio that can be distributed to villages in developing countries for communicating health tips and announcements from nearby clinics, or an affordable, lightweight backpack to reduce user back injuries. A variety of design-based learning processes exist. They typically involve a cyclical engineering design process of 1) defining the program, 2) researching the problem, 3) developing possible solutions, 4) choosing the best solution, 5) creating a prototype, 6) testing
and evaluating the prototype, 7) communicating the design, and 8) redesigning the prototype based on feedback.

**RESEARCH ON PROJECT-BASED LEARNING**

According to Thomas (2000), the research on PBL began in the 1990s. His review of the early years of PBL pointed out how a broad definition of PBL presents a few problems. When reviewing research projects, the degree to which observed classroom practices meet the five essential features of PBL is difficult to determine. For example, to what extent are packaged materials with scripted student roles authentic learning experiences and thus considered to be PBL curriculum? Additionally, differences in the PBL types (i.e., challenge-based, problem-based, place-based, activity-based, design-based) are an important consideration when making generalizations based on similarities. The limitations of interpreting the PBL research should be considered when reporting on PBL effectiveness.

The Center of Excellence in Leadership of Learning (2009; Bradley-Levine, Berghoff, Seybold, Sever, & Blackwell, 2010) at the University of Indianapolis prepared a summary of research on project-based learning, reporting positive student learning outcomes in the areas of content knowledge, engagement and motivation, and critical thinking and problem-solving skills. The student benefits of project-based learning include improved attendance, advanced self-reliance, and enhanced attitudes toward learning (Thomas, 1998); equal or better academic gains with greater acceptance of responsibility for learning (Boaler, 1999; SRI, 2000); increased development of complex skills (i.e., higher-order thinking, problem-solving, collaborating, and communicating; SRI, 2000); and access to a broader range of learning opportunities propitious for engaging culturally diverse learners (Railsback, 2002).

PBL research shows positive effects on student content knowledge (Boaler, 1997; Penuel & Means, 2000; Stepien, Gallagher, & Workman, 1993), including students with special needs. Research conducted by Mergendoller, Maxwell, and Bellisimo (2006) and Mioduser and Betzer (2003) concluded that students with limited prior content knowledge and students with average to low verbal ability learned more in PBL classes. Filippatou and Kaldi (2010) also found gains in academic performance of students with learning disabilities resulting from the use of PBL. Additionally, PBL improved students’ specific content-area skills (Hernandez-Ramos & De La Paz, 2009; Mioduser & Betzer, 2003; Peck, Peck, Sentz, & Zasa, 1998). For example, Barron and associates (1998) found 84 percent of students working on a geometry design project linked to architecture developed blueprints meeting architectural building standards. According to Boaler (1997), PBL results in students with useful, real-world content knowledge applicable to a variety of tasks.
A high level of student engagement is another benefit of PBL (Belland, Ertmer, & Simons, 2006; Brush & Saye, 2008). For one study involving a PBL economics unit, students with low and high levels of interest, including students with an initial low interest in economics, engaged in learning (Ravitz & Mergendoller, 2005). Research by Bartscher, Gould, and Nutter (1995) reported that PBL had a positive effect on student motivation to learn. In a study of elementary teachers dedicating 37 percent of instructional time to PBL, students’ work ethic, confidence, and attitudes towards learning improved (Tretten & Zachariou, 1995). While most of the research on PBL engagement is positive, Edelson, Gordon, and Pea (1999) concluded that sustaining high school student interest was difficult; although, freedom to determine project requirements leads to changing student beliefs (Grant, 2009) and positive attitudes (Hernandez-Ramos & De La Paz, 2009).

Students participating in PBL demonstrate improved critical-thinking and problem-solving skills (Mergendoller, Maxwell, & Bellisimo, 2006; Shepherd, 1998; Tretten & Zachariou, 1995). In one PBL study, students with low ability increased their use of high-order critical-thinking skills (i.e., synthesizing, evaluating, predicting, and reflecting) by 446 percent, while students with high ability improved by 76 percent (Horan, Lavaroni, & Beldon, 1996). Barron and colleagues (1998) found students’ initiatives, such as using resources and revising work uncharacteristic prior to engaging in PBL, present during PBL. While other studies also found improved scientific investigation skills (Baumgartner & Zabin, 2008) and critical-thinking skills (Doppelt, 2009), Beringer (2007) reported limited problem-solving skills due to students’ difficulty with adapting to the PBL structure.

When implemented in cooperative learning groups, PBL benefits the development of collaborative skills for a variety of students (Bradley-Levine et al., 2010). PBL provides occasions for elementary students to view events through multiple different perspectives and to learn conflict-resolution skills (Chan-Lin, 2008); for students with special needs to develop social skills including patience and empathy (Belland, Ertmer, & Simons, 2006); and for students with low abilities to demonstrate teamwork, management, and conscientiousness. Belland and associates (2006), and Lightner, Bober, and Willi (2007) reported that students enjoyed the opportunities cooperative projects through PBL provide for interacting with friends and making new friends. Group efficacy and self-efficacy, however, depend largely on the quality of the instructor to facilitate group processing (Weng-yi Cheng, Shui-fong, & Chung-yan Chan, 2008), especially for groups of older adolescents struggling to work collaboratively (Achilles & Hoover, 1996). An added benefit to collaboration, in the science classroom especially, is growth in the development of a sense of a scientific community (Baumgartner & Zabin, 2008).
CRITIQUE OF PROJECT-BASED LEARNING

In early studies on the effectiveness of one type of PBL, problem-based learning in medical education, Albanese and Mitchell (1993; Strobel & Van Barneveld, 2009) found students tended to perform lower on standardized tests, having not adequately covered the breadth of content. Similarly, in a review of studies conducted from 1992 to 1998, Colliver (2000) concluded that PBL did not convincingly improve knowledge base. While Dochy, Serges, Van den Bossche, and Gijbels (2003; Strobel & Van Barneveld, 2009) supported this finding in their review of 43 studies, they concluded that assessment measures focusing on application of knowledge favored PBL over traditional learning environments.

Despite the number of positive benefits, critics of PBL mainly cite the challenges for teachers, especially if PBL represents a substantial change from a consistent teaching perspective and a dramatic departure from the theoretical basis of established practices. Effective facilitation of and prior teaching experiences with PBL are important factors as authoritative classroom management, previously established inquiry classroom culture, and beliefs about the nature of teaching and learning may attribute to the effectiveness of PBL (Pecore & Bohan, 2013). Marx, Blumenfeld, Krajcik, and Soloway (1997) found the following barriers to successful implementation of PBL: 1) length of time for in-depth exploration, 2) adherence to district curriculum guidelines, 3) balance of healthy student control, 4) control of the flow of information, 5) scaffolds to balance student independence with supports, 6) use of technology as a cognitive tool, and 7) design of authentic assessment to measure student understanding. In general, teachers address a few challenges per PBL event, gradually incorporate techniques with varied success, and resort back to established practices when confronted with feelings of discomfort (Marx et al., 1994; Marx et al., 1997; Pecore & Shelton, 2013). Well-established practices and entrenched beliefs lead to additional struggles for teachers, causing challenges when negotiating the tensions between students exploring their interests and covering state standards, respecting student responses and providing accepted answers, and empowering student self-directed learning and controlling the distribution of expert knowledge (Ladewski, Krajcik, & Harvey, 1994).

CONCLUSION: KILPATRICK’S LASTING LEGACY

While dating back to the early 18th century, the use of projects to drive learning gained popularity after Kilpatrick’s (1918) project method. Almost 100 years after publication, “The Project Method” is considered by educators to be one of the 10 most influential curriculum documents (Beineke, 1998). The project method has always been integrated into the curriculum in one form or another. However,
toward the end of the 20th century, project method took on a new life, re-imagined as project-based learning. Advances in educational psychology on how children learn, from Piaget, Vygotsky, and Bruner, as well as more recent research on learning theory, including multiple intelligences (Gardner, 1983), theories of intelligences (Sternberg, 1985), learning communities (Lave & Wenger, 1991), and choice theory (Glasser, 1998), have led to a change in the project method from Thorndike’s psychology of learning informing to constructivist learning as the theoretical framework for PBL.

Although both Kilpatrick’s project method and its contemporary, PBL, operate under broad interpretations, key essential features aligned to a constructivist framework are necessary components of a PBL environment. While Kilpatrick’s idea of the student-determined project was most problematic to his colleagues, PBL currently continues to operate mostly through teacher-led, student-driven projects. A broader interpretation has led to the creation of a number of X-based learning approaches, which adhere to the features of the constructivist PBL model but provide more specific learning features. One of the issues of a broad interpretation is the challenge of interpreting research data, as the degree to which PBL approaches are implemented varies.

For Kilpatrick, “The project method is not a device but an idea to be developed in education” (Beineke, 1998, p. 116) and acknowledges the tentative, incomplete, and untested nature of the ideas, suggesting years later the gathering of systematic evidence on the process and possibility (Beineke, 1998). The beginning of the 21st century has produced much research in support of project-based learning (Bredley-Levin et al., 2010). Support for PBL instruction from the education community led to the creation of Interdisciplinary Journal of Problem-Based Learning in 2006 and the publication of a special issue on the efficacy of problem-based learning in 2009. When done well, proponents of PBL emphasize student gains such as improved thinking skills, enhanced cognitive abilities, and increased interest and enjoyment in the content. Other gains mentioned are students becoming more independent learners as measured by more frequent use of libraries and other information resources, acquiring life-long learning skills, and developing a more holistic approach to content. PBL supporters also characterize PBL-educated students as more adaptable to change and able to work well as team members (Smith, 1995; Sonmez & Lee, 2003). Researchers attribute the increased success of students participating in PBL to a constructivist framework of effectively activating prior knowledge, promoting meta-cognition through increased elaboration of information, greater understanding and recall, and situating learning in a “real-world” context (Sonmez & Lee, 2003).

In response to the advantages and increased awareness of PBL, public, charter, and private schools are self-identifying as PBL environments. While many of these schools embrace PBL as a method of instruction, the degree to which the
teachers implement, with fidelity, a PBL approach varies, as the tendency is for teachers to adapt PBL to preexisting systems of practice (Pecore, 2012). Thus, studies show the challenges to implement PBL effectively without inquiry-facilitation skills and organizational supports (Brush & Saye, 2008; Krajcik, Blumenfeld, Marx, & Bass, 1998). The degree to which teachers implement the five essential features of PBL within a constructivist framework often varies. Pecore and Bohan (2013) suggested tackling the challenges of facilitating PBL by addressing motivation with a suitable problem, positive student-teacher relationships and focused checkpoints; facilitation through carefully monitoring and skillfully guiding student progress; collaboration by providing structure and accountability; and reflection through discussions that foster thinking about knowledge gains.

Almost prophetically, Kilpatrick expressed several warnings in an adoption of a project method approach. He voiced a need for changes in textbooks, curriculum, grading, and student advancement as well as modifications to furniture and school architecture. Most insightfully, he predicted opposition from incompetent or unprepared teachers (Beineke, 1998), recognizing the need to adequately educate teachers. Being grounded in best modern practices, Kilpatrick was optimistic that a project method approach would result in student development in terms of citizenship, critical thinking, intelligent actions, and adaptability to new social conditions (Beineke, 1998). A decade later, research on PBL provides a degree of affirmation for Kilpatrick’s optimism.

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