PROJECT-BASED INSTRUCTION:
A Review of the Literature on Effectiveness in Prekindergarten through 12th Grade Classrooms

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Abstract

This article provides a review of research (2000-2011) regarding the effectiveness of project-based instruction in preschool, elementary and secondary school classroom settings, including academic, learner, and teacher response outcomes. First, the review provides some historical context, and a definition of project-based learning. Next, the reviewer synthesizes several themes emergent in the literature, including student and teacher attitudes, academic outcomes, and information about what recent research on project-based learning has shown as it has been used with specific student subgroups. Finally, the author provides a perspective on factors that can enhance or detract from instructional success with project based methodology, and suggest directions for further research. Overall, current research offers a generally positive view of project-based methodology, with some practical and theoretical caveats voiced by practitioners and researchers.

Introduction

Project-based learning, a teaching methodology that utilizes student-centered projects to facilitate student learning (Mergendoller, 2006), is touted as superior to traditional teaching methods in improving problem solving and thinking skills, and engaging students in their learning (Berends, Boersma & Weggemann, 2003; Scarborough, Bresnen, Edelmann, Laurent, Newell & Swann, 2004; Tsang, 1997). Popular in pre-professional training in medicine, science, technology, engineering and mathematics careers since the 1970's, momentum has more recently developed to extend these practices to elementary and secondary classrooms (Buck Institute, 2005; Knoll, 1997).

Definition

While most commonly known as a part of adult education, project-based learning for school-age children is not new. Project-based learning can be described as student-centered instruction that occurs over an extended time period, during which students select, plan, investigate and produce a product, presentation or performance that answers a real-world question or responds to an authentic challenge. Teachers generally serve as facilitators, providing scaffolding, guidance and strategic instruction as the process unfolds. According to an historical survey of project- and problem-based learning undertaken by Michael Knoll at the University of Bayreuth in Germany (Knoll, 2006), project methodology in American education can be traced to an early 20th century description offered by William H. Kilpatrick (1918), which referred to the Project Method as "a hearty, purposeful act", generally a project or pursuit, undertaken by the child, which has four distinct, student-centered phases: purposing, planning, executing and judging. Ideas such as these, combined with the model for scientific inquiry, have contributed to a

variety of student-centered methods such as problem-based, case-based, discovery learning, and expeditionary learning (Knoll, 1997; Thomas, 2000; Prince & Felder, 2007).

In a review of the research on project-based learning, Thomas (2000) identified five distinguishing features of project-based learning:

- The use of projects that focus on content that is central to the curriculum. These projects become the primary vehicle for content learning, and often, assessment.
- Projects are based on questions of importance or *driving questions* (Blumenfeld et al., 1991). Driving questions must be germane to the content, and crafted both to engender optimal student engagement and foster active intellectual pursuit of solutions.
- Projects involve students in ways that require them to identify problems, develop and design solutions, and create an end product such as a presentation, report, invention, or model.
- Projects are student-centered to the greatest extent possible. Teachers serve as resources, facilitators and guides, but it is the students who define, choose and carry out their projects.
- Projects are developed from reality-based ideas and problems rather than on academic exercises and pursuits. The projects represent authentic efforts in solving or investigating real-world dilemmas.

Both Thomas (2000) and Kilpatrick (1918) emphasize depth of learning and intrinsic motivation as key benefits of this methodology, as well as a focus on student-centered, systematic inquiry.

A number of researchers and educational theorists have adopted the principles of project-based learning as a foundation for related methodologies (Knoll, 1997; Prince & Felder, 2006). The goal of these methodologies is to move education toward more student centered, inquiry-based, active learning methods. The intent is to help students become self-directed learners who can apply sound higher-order thinking skills. Meyer (2004) describes three broad inquiry-based approaches that emerged as a response to the rise of constructivist ideas about learning in the 1960's: inquiry on the basis of understanding problem-solving rules based on the work of Jerome S. Bruner; in the 1970's, Jean Piaget's conservation of strategies applied to problem solving, and Seymour Papert's contributions to discovery learning applied to computer programming concepts. Far from supporting such approaches, however, Mayer contends that constructivist, student-centered, discovery learning that minimizes the need for expert guidance and downplays the role of the teacher has repeatedly failed to deliver promised gains in student autonomy and the development of problem solving and thinking skills (Kirschner, Sweller & Clark, 2006; Mayer, 2004).

Mayer (2004) is not alone in challenging the utility of student-centered teaching. Some theorists believe that such teaching methods are in direct conflict with cognition research that demonstrates not only that learners in the novice stage do not attend to critical problem features or employ effective problem solving strategies, but that they should not necessarily be encouraged to do so. Kirschner, Sweller & Clark (2006) assert that the ideals of constructivist, project-based learning may miss the mark by leaving too much at the discretion of novice learners. They suggest that leaving students to self-direct can result in sustained misconceptions and multiple "false starts". Accordingly, adherence to a highly student-centered approach that does not promote strategic teacher intervention and guidance may prove inefficient and/or ineffective (Bransford, et al., 2000; Kirschner, Sweller & Clark, 2006). Similarly, Blumenfeld, et al. (1998) described numerous classrooms where project based learning activities were being conducted, but where project results did not live up to expectations because the students got "stuck" or channeled their inquiry efforts in unproductive directions. They concluded that teacher involvement and guidance is needed for optimal learning.

Regardless of the opinions of theorists, the idea that students can become independent, motivated learners, able to apply their skills to real-world problems through personal and group inquiry is an energizing prospect that, as Kirschner (2006) put it, "appeals to (educators) intuitively", and project-based programs and materials such as Expeditionary Learning (http://elschools.org), the *The Jasper Series* from Vanderbilt University (The Adventures of Jasper Woodbury Videodisc Series, 1992), and other commercial products which bundle resources and simplify implementation for practitioners, have met with some commercial and pragmatic success (David, 2008; Thomas, 2000). A number of school reform efforts (e.g., Ravitz, 2008) utilize project-based learning as a cornerstone of their design. Yet, for most schools and teachers, project-based instruction is carried out on an individual classroom scale that exists outside the eye of the research community. A review of the literature prior to the year 1999 (Thomas, 2000) found little research on home-grown, project-based learning in single schools and classrooms, while more recently, David (2008) reported that although project-based instructional practice continues to take place most typically in isolated schools and classrooms, little is known about the effectiveness of this approach in these settings, particularly when compared with other methods of instruction.

What does current research say about the effectiveness of project-based learning at the individual classroom level? The purpose of this literature review is to summarize peer-reviewed research on the effectiveness of project-based learning over the past decade, as it pertains to prekindergarten through 12th grade classrooms. It includes studies that address academic outcomes, developmental gains, student perceptions about project-based versus traditional learning, attitudes toward subject matter, group process, perceptions of peers, and in some cases, perceptions of efficacy. Efficacy in this context can be defined as a belief in the abilities of a group or an individual to meet a goal, or achieve a desired outcome.

Method

The review was conducted by means of searches of electronic databases of education-related journals and publications, including *Academic Search Premier*, *Education Research Complete* and *ERIC*. Articles were identified using the terms 'project method' and 'teaching' in combination with search restrictions to peer-reviewed articles in the English language that were published between January 2000 and June 2011. The initial search results yielded 768 articles. Manual sorting of these results was used to retain only articles pertaining to research relating to prekindergarten through 12th grade students and related to the instructional effectiveness of project-based learning as carried out in classroom settings (as opposed to distance learning), and the reference sections of the remaining articles checked for other articles that would meet the review criteria. Altogether, a total of seventeen articles were identified for inclusion.

In order to provide a frame of reference for the varying quality of research methods, information, and reporting across the included articles, the author utilized a screening process, adapted from Fink (2005), that focused on identifying whether or not:

    (a) the main outcome variables were defined;
    (b) evidence was offered as to the appropriateness of any psychometric instruments used in data collection;
    (c) data were collected prospectively;
    (d) the study population was randomized;

(e) the final sample size was explained and/ or response rate adequacy for interviews and surveys was explained;

(f) the information offered was directly related to the effectiveness of project-based learning;

(g) the researchers provided psychometric evidence for the validity of the data sources used for the main variables (i.e., achievement, self-efficacy, IT skills, group process skills, etc.), and

(h) the data analysis process was explicit.

Points were awarded for each factor, with one point representing partial or present-but-unclear elements and two points representing elements that were well-described and fully in place. No points were given if an element was absent, or the process for development or inclusion could not be determined. In the case of studies re-published in English but that were originally documented in other languages, each study was reviewed as carefully as possible to determine the researchers' intended meaning and minimize translation effects. A list of the articles included and the scores for each are provided in Table 1. Summary information for the articles is provided in Table 2.

Table 1. *Evaluative scores for articles identified in the literature review.*

Article	Category Scores								Total
	a	b	c	d	e	f	g	h	
Alacapinar, 2008	2	2	1	0	1	-	2	-	8
Aral, Kandir, Ayhan & Yasir, 2010	2	2	2	1	1	-	2	2	12
Baumgartner & Zabin, 2008	2	2	2	1	1	-	2	2	12
Beneke & Ostrosky, 2008	2	1	2	0	1	1	2	2	11
Bickaki & Gursoy, 2010	2	2	2	1	1	-	2	2	12
Cheng, Lam & Chan, 2008	2	1	2	2	1	-	0	2	10
Chu, Tse & Chow, 2011	2	1	2	0	1	-	1	2	9
Duncan & Tseng, 2010	2	-	2	1	1	-	2	1	9
Faris, 2008	2	0	2	1	1	-	2	0	8
Gutelkin, 2005	2	0	2	1	1	-	2	1	9
Geier, et al., 2008	2	2	2	2	2	-	2	2	14
Grant & Branch, 2005	2	1	2	1	1	-	2	1	10
Hertzog, 2007	2	1	2	1	1	1	2	2	12
Kaldi, Fillipatou & Govaris, 2011	2	1	2	1	2	-	2	2	10
Mergendoller & Maxwell, 2006	2	2	2	2	1	-	2	2	13
Mioduser & Betzer, 2007	2	1	2	2	1	-	2	1	11
Tal, Krajcik & Blumenfeld, 2006	2	1	2	2	1	-	2	1	11

Table 2. *Summary information for articles included in the literature review.*

Author(s)	Location	School Setting	Focus of Study	Findings
Alacapinar, F. (2008)	Turkey	Public, 5th	*Quasi-Experimental, Qualitative:* The effects of project-based learning (PBL) on cognitive and psychomotor achievements and affective domain. Data collection: Video, interviews, psychomotor instrument.	Students in the experimental group showed gains in achievement, and in cognitive and psychomotor domains. Students enjoyed the project work and noted improved self-confidence, creativity, ability to plan and develop ideas, problem-solving skills, and the benefits of working in groups.
Aral, et al. (2010)	Turkey	Public, K	*Quasi-Experimental:* The effects of project-based instruction on learning outcomes. Data Collection: BBCS-R, a measure of basic concepts, for kindergarten	Students in the experimental group showed slightly greater gains after weekly PBL instruction over 12 weeks. Results on the BBCS-R were not strongly indicative of difference, however.
Baumgartner, et al. (2008)	United States	Charter, 9th	*Qualitative:* Examined whether PBL would increase students' knowledge of scientific investigation and foster positive attitudes about the content. Data Collection: Pre/post self-reporting of content knowledge, essays, field journals.	Students reported increased content knowledge, and understanding of the processes of scientific investigation. Student comments reflected a change toward more positive views by the conclusion of the project.
Beneke & Ostrosky (2008)	United States	Public, Pre-K	*Qualitative:* Explored preschool teacher perceptions of PBL and the responses of their students. Data Collection: Pre/post interviews	All teachers reported positive views of PBL. Most felt that their students were successful, noting improved interest and motivation, a shift from functional to representational play, and fewer disciplinary issues. The projects offered ways for differently-abled students to serve as experts in certain areas. Most teachers felt there were benefits in bringing "real" objects into the classroom for play and construction.
Bicaki & Gursoy (2010)	Turkey	Private, Pre-K	*Quasi-Experimental:* The effect of PBL on specific developmental areas in preschool children. Data Collection: Pre/post testing on the Brigance Early Development Inventory II and retention test.	The children in the experimental group scored higher on the posttest on the overall scores of the Brigance II, more specifically in the areas of receptive and productive language area A follow up test indicated that these gains were long-term.

Cheng, et al. (2008)	Hong Kong	Public, 7th-9th	*Quantitative:* The effect of achievement level and group heterogeneity on group process and self-efficacy in PBL. Data Collection: Questionnaire of group- and self-efficacy.	The quality of group process was determined to be a predictor of self-efficacy in PBL for both high and low achieving students. Group makeup did not appear to be a predictor for efficacy for high or low achieving students.
Chu, et al. (2011)	Hong Kong	Public, 4th	*Mixed Methods:* The effects of combining a collaborative teaching approach with inquiry project-based learning. Data Collection: Pre and post intervention student questionnaires and semi-structured parent and student interviews.	Collaborative and project-based approaches had a positive effect on student development of information literacy and information technology (IT) skills. Students also reported that the IT skills they learned had a discernible application.
Duncan & Tseng (2010)	United States	Public, 9th	*Mixed Methods:* To document the development and pilot implementation of a PBL biology unit. Data Collection: Video/audio, student artifacts, observation, curriculum-based measures.	Substantial general gains in student learning of content concepts, although the depth and detail of what was learned was less than researchers had anticipated. When compared to achievement results in a related study, PBL students showed improved understanding overall.
Faris (2008)	Qatar	Private, 9th	*Qualitative:* To determine if PBL affects student perceptions of group work, content and PBL itself. Data collection: Questionnaire, observations.	Students viewed group work more positively and the subject matter more favorably after participation in a project-based science unit.
Geier, et al. (2008)	United States	Public, 7th-8th	*Quasi-Experimental:* To compare student science achievement under PBL to achievement under traditional instruction. Data Collection: Standardized assessments in science.	PBL was shown to be more effective in delivering content. Researchers point out that this study was conducted within a wider school reform, and that other factors may also have contributed to the results.
Grant & Branch (2005)	United States	Private, 8th	*Qualitative (Case Study):* To explore how individual differences and abilities (multiple intelligences) were employed in the completion of projects. Data collection: Interviews and project artifacts.	PBL was found to offer flexibility in allowing for the expression of individual differences and preferences in project development. Some multiple intelligence domains were not employed in the completion of the projects. Students cited practical reasons.

Gultekin (2005)	Turkey	Public, 5th	*Quasi-Experimental, Qualitative:* To determine the effects of project-based instruction on learning outcomes for 5th grade social studies students. Data Collection: Achievement testing, interviews.	Students in the project-based class showed greater academic gains than their traditionally taught peers. Gains were also noted in higher order thinking and research skills. Students reported positive views of project-based learning, the content, and their efforts in completing the work.
Hertzog (2007)	United States	Public, 1st	*Qualitative:* To document how a project-based approach was implemented in two first grade classrooms and to identify benefits and barriers. Data Collection: Interview and observational data.	Teachers had difficulty implementing the project approach because of their beliefs regarding teaching and children, and felt ambivalent about devoting time to projects instead of other types of instruction. District and school policies and curriculum also acted as constraining factors. Both teachers made a shift toward more student-centered activities, even when they were not engaged in formal project based units. Both teachers noted greater engagement when students were doing projects.
Mergendoller & Maxwell (2006)	United States	Public, 12th	*Qualitative:* To compare the relative effectiveness of traditional and project-based instruction in 12th grade social studies. Data Collection: Quick Word Test-Level 1, Interest survey on Economics, survey on group work, measure of problem solving ability, curriculum-based measure on the content.	Quantitative analysis of student achievement yielded modestly higher achievement in the PBL group. Students who scored in the mid to low tertiles on the Quick Word Test showed the greatest gains in content learning; these gains were not particularly significant on the group scale, but at the student level, translated to about one-half grade difference, suggesting potential use of PBL as a means of heightening achievement in students who struggle with traditional methods. PBL was also found to foster relatively higher interest in the subject matter.
Mioduser & Betzer (2007)	Israel	Public, 11th-12th	*Quasi-Experimental:* To determine the effect of PBL on high achieving students' academic performance, skills acquisition and attitudes toward technology, in comparison to students in technologically-focused schools. Data Collection: Pre/post national exam on content, survey, observations, rating scale.	Students in the experimental groups, and girls in particular, showed higher gains in academic content knowledge when compared to the traditionally taught students. Students in the PBL group also showed greater improvement in their attitudes toward technology. The researchers conclude that PBL has the potential to increase academic attainment and to foster greater student engagement in the subject matter.

Tal, Krajcik, & Blumenfeld (2006)	United States	Public, 7th-8th	*Qualitative:* To document instances of good teaching in PBL. (Student outcomes were reported as part of this study). Data Collection: Interviews, observations, student achievement data on course content.	PBL yielded greater student performance on posttests when compared to other classrooms taught by less skilled teachers, suggesting that teacher skill is an important factor in the success of project-based instruction, contributing to classroom management, planning, positive interactions, high expectations, open-ended and student centered questioning. Suitable curriculum materials and solid teacher content knowledge are also keys in the success of PBL.

Discussion

Examination of the included studies yielded a number of areas of interest. These areas include comparisons to traditional lecture-based instruction, effect on student attitudes and self-perception, developmental effects, effects on diverse learners, teacher attributes, and the overall quality of the identified research studies.

Overall Quality of the Research
Given the constructivist theoretical underpinnings of project-based instruction, it is perhaps not surprising that only a third of the identified studies offered comparative data as a major component (Alacapinar, 2008; Aral, Kandir, Ayhar, Yasar, 2010; Bickaki & Gursoy, 2010; Fillipatou & Govaris, 2011; Geier, et al., 2008), and a handful of other studies some lesser degree of comparative analysis (Faris, 2008; Krajcik, Neill & Reiser, 2007; Mergendoller & Maxwell, 2006; Tal & Krajcik, 2006). The remaining studies, comprising a majority of those identified, provided information that was more descriptive and qualitative in nature. It is interesting to note that most of the quantitative, comparative, studies originated outside the United States (Alacapinar, 2008; Aral, Kandir, Ayhan, Yasar, 2010; Bicaki & Gursoy, 2010; Faris, 2008; Gultekin, 2005; Kaldi, Fillipatou & Govaris, 2011), raising the possibility that the predominance of qualitative studies is a result of this review's self-restriction to studies published in English. The multi-national nature of this grouping of studies posed additional challenges due to ambiguous translations, and internal reference to citations that were not available in English, for clarification.

Project-Based Learning and Traditional Lecture-Based Instruction
Although descriptive studies of project-based learning provide important information on participant perspective and experience, studies that compare project-based learning to traditional instruction offer factual insight into the relative value of project-based instruction as a means of reaching student mastery of curricular content and process skills. Overall, comparative studies identified for this review found project-based learning to be an effective means of teaching both content information and related skills. Students in project-based classrooms exhibited greater gains in content knowledge than their traditionally taught peers (Baumgartner & Zabin, 2008; Duncan & Tseng, 2010; Geier, et al., 2008; Gultekin, 2005; Kaldi, Fillipatou & Govaris, 2011; Mergendoller & Maxwell, 2006; Mioduser & Betzer, 2007; Tal, Krajcik & Blumenfeld, 2006). Gains were also higher in the areas of process and group skill development and information literacy skills when compared to lecture-based classrooms (Baumgartner & Zabin, 2008; Cheng, Lam & Chan, 2008; Chu, Tse & Chow, 2011; Kaldi, Fillipatou & Diamanto, 2011; Mergendoller & Maxwell, 2006; Mioduser & Betzer, 2007).

Effects on Student Attitudes and Self Perception

Many of the qualitative studies in this review sought to illuminate student reactions to participation in project-based instruction, and to create a window to some of the less-tangible effects of learning through projects. In all studies where student attitude was examined, project-based learning was perceived positively by participants, and described as fostering greater engagement with the subject matter. Students reported enjoying the active, hands-on approach to content, as well as improved perceptions of the subject matter. (Barron, et al., 1998; Baumgartner & Zabin, 2008; Beneke & Ostrosky, 2008; Blumenfeld, et al., 1991; Chu, Tse, & Chow, 2011; Faris, 2008; Hertzog, 2007; Hmelo-Silver, Duncan, & Chinn, 2007).

Developmental Effects

Two studies focused upon the comparative effects of project-based instruction versus traditional instruction on early concept development in preschool children (Aral, Kandir, Ayhan & Yasir, 2010; Bicacki & Gursoy, 2010). While the sample sizes for each study were relatively small, in both cases, project-based instruction was found to result in greater developmental growth in language and concept development than traditional instruction.

Effects on Varied Learners

Several studies looked at the effects of project-based learning on categories of learners or learner characteristics that are associated with school failure in traditional classroom situations. Beneke and Ostrosky (2008) examined teacher perceptions of how project-based instruction affected diverse learners in seven preschool classrooms. Teachers reported that the real-world focus of the projects allowed students who did not generally shine in academic discussions to share their knowledge about subject-matter that was familiar and accessible. Teachers in this study also reported a reduced need for disciplinary actions during project-based study, citing increased student engagement as the chief reason. Additionally, several studies indicated that the beneficial academic effects of project-based instruction were most pronounced for middle- to low-achieving students (Mergendoller & Maxwell, 2006; Tal, Krajcik and Blumenfeld, 2006).

Teacher and Setting Attributes

A number of researchers focused on identifying the specific teacher skills, expectations, and other attributes that might be contributing to the success of project-based instruction. Duncan and Tseng (2010) found that good classroom management skills, solid content knowledge, the ability to set clear learning goals, the ability to anticipate difficulties, willingness to support students on an as-needed basis, an understanding of individual differences, and a positive and encouraging approach to interactions with students were all important. Consisting predominantly of skills already known to enhance student achievement regardless of educational setting or specific teaching methodology, this list raises the possibility that much of the success in project-based learning is not due to the core values or practices unique to student-centered instruction, but rather that teachers simultaneously implement a variety of evidence-based practices – in other words, that good teaching transcends methodology.

The fact that project-based instruction requires multiple and fundamental shifts in classroom practices is highlighted by teachers' reactions to it. Across a number of studies, teachers expressed reservations about putting project-based instruction into place because of the changes it required in the way they taught, the materials and resources they offered, and in the way they prepared and planned for instruction. Both Beneke & Ostrosky (2008) and Hertzog (2007) cited teacher resistance as a limiting factor in student success and overall effectiveness of project-based instruction; similarly, Mergendoller and Maxwell (2006) found that teacher expectations regarding the potential of project work and teacher

views of student abilities and limitations were directly connected to student learning outcomes, and concluded that not all teachers might be well-suited to project-based instruction. Hertzog (2007) recommended that professional development occur over an extended period with follow-up and mentoring to facilitate success for both teachers and students.

While it is tempting to blame teachers who are reluctant to adopt project-based instruction, it is important to note that such teachers may be reacting to genuine factors in their schools or setting that can make adoption of new teaching methodologies genuinely difficult. In an educational system that seems chronically short of personnel and funds, little is known about the cost of pursuing a project-based approach in terms of time, resources, balance with other school and system demands, teacher workload, and the interaction between project-based instruction and other requirements, such as teaching to standardized tests, that are placed on educators. As in many areas of educational achievement, systems variables have their own effects. Ravitz (2007) surveyed teachers from a variety of high schools that were using project-based approaches. Not surprisingly, achievement was higher in schools where the systems and policies aligned with project-based ideals were higher. The optimal application of project-based instruction requires change not only in the classroom, but at school and system levels to optimize effectiveness (Barron, et al., 1998; Blumenfeld, et al., 1991; Duncan and Tseng, 2010; Geier, et al., 2008; Ravitz, 2007).

It is notable that nearly all the project-based instruction in a single content area reported in these studies occurred in the content areas of social studies or science. Given that the first application of problem-based instruction as a classroom teaching tool originated in the medical sciences (Knoll, 1997), the continuing connection with science is not surprising. In regard to social studies, one can speculate that it offers a flexibility to choose topics and themes which are easily adapted for project work, as opposed to subject areas that are more systematically introduced and might require a somewhat different approach in order to develop successful project-based activities.

Conclusion

Overall, studies conducted over the last ten years confirm earlier, generally positive findings (Thomas, 2000; Barron, et al., 1998) regarding the efficacy of project-based instruction. Project-based instruction in prekindergarten through 12th grade has yielded improved content learning, higher levels of engagement and more positive perceptions of the subject matter. With such a clear research base in support of its effectiveness, project-based methods appear to offer the possibility of success both overall and to a broader range of students than traditional lecture-based instruction.

Research clearly indicates that project-based learning is beneficial, with positive outcomes including increases in level of student engagement, heightened interest in content, more robust development of problem-solving strategies, and greater depth of learning and transfer of skills to new situations (Hmelo-Silver, 2007; Thomas, 2000; Barron, et al., 1998). With renewed emphasis being placed on the basics of education, and increasing pressure to streamline instruction and teach to specific standards, the idea that the most effective instruction for these goals is also one that fosters depth of learning and engages students on a personal level is quite appealing.

In order to retain the beneficial aspects of project-based instruction and avoid the confusion that occurred in the mid 20th century when increasing numbers of theorists promoted related methodologies, but failed to prescribe adequate practical information to support successful long-term practice (e.g., Mayer in 2008), research that seeks to clearly distinguish between effective and ineffective elements of project-based instruction should continue. Areas in particular need of further exploration include how

and when project-based instruction is most appropriate, how school structures and policies might be adjusted to best support teachers and learners, and how to maintain content integrity and meet federal and state learning standards while incorporating the authenticity of real-world issues and ideas.

Project-based methodology offers highly desirable benefits, yet implementation poses some practical difficulties within the current context of American classrooms. What is needed is a realistic approach that encourages teachers to incorporate successful, proven elements of project-based learning into classroom practice. Researchers should continue to refine understanding and respond to the practical challenges of this teaching method.

Acknowledgement

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[§] **MARGARET HOLM**, M.A., M.Ed., is a doctoral student at Rivier College. She is Curriculum Coordinator for Language Arts and Social Studies, K-8 for the Bedford, NH School District. Her current research interests include project-based and cooperative learning, literacy development and writing instruction. She lives in Londonderry, NH, with her very supportive husband and is mother to three exceptional daughters. She began her educational journey at California State University, Los Angeles, but has been a New Hampshire resident since 1984. In addition to her interest in all things educational, Maggie is an avid cook, collector of children's picture books, gardener and potter.

The concept of project-based learning (PBL) has garnered wide support among a number of K-12 education policy advocates and funders. We included studies of problem-based learning in our review of the implementation and effectiveness research when studies investigated a problem-based learning intervention that implicitly or explicitly aligned with the PBL design principles reviewed for this paper. 3. In his review of the literature, Thomas (2000) noted that no universally accepted set of practices constituted PBL, nor was there an agreed-upon distinction between PBL and other student-centered, inquiry-based approaches such as inquiry-based learning, problem-based learning, place-based learning, and service learning.5 In an attempt to clarify what PBL is (and is not), some. Project based instruction: a review of the literature effectiveness in prekindergarten through 12th grade classrooms review academic, 7. (2). has been cited by the following article: Article. Implementing Project Based Learning Approach to Graphic Design Course. T test score indicates that the difference between pre and posttest significantly differ due to student improvement in doing their task and assignments. Keywords. project based learning, borg and gall development model, graphic design course. Pages. Home. ABSTRACT Noting that kindergarten teachers in Nevada report that many. children enter school with considerable delays in language and vocabulary, this report focuses on the public support of prekindergarten education for school readiness in Nevada. The report discusses the purposes and benefit of early childhood education, examines the initiatives of other states and countries with regard to prekindergarten education, and identifies prekindergarten programs already operating in Nevada. Presented in tabular format is information on prekindergarten education in Nevada for fiscal year 1999, inclu Effective schools, equity and teacher effectiveness: a review to the literature. Escuelas eficaces, equidad y eficacia docente: Una revisión de la literatura. Pam Sammons and Linda Bakkum University of Oxford, Department of Education. E-mail: pamela.sammons@education.ox.ac.uk. Abstract: This paper offers an introduction to the literature on school effectiveness, equity and teacher effectiveness research. It summarises and extends a larger report and discusses definitions of effective and ineffective schools and the surrounding debate. It further highlights research findings of studies investig A literature review is a survey of scholarly knowledge on a topic. It is used to identify trends, debates, and gaps in the research. Writing a literature review involves finding relevant publications (such as books and journal articles), critically analyzing them, and explaining what you found. You should be able to answer it based only on a review of existing publications. Research question example. What is the impact of social media on body image among Generation Z?