The Effects of Project Work in a First-Grade Classroom: A Little Goes a Long Way

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Abstract

This article discusses how a brief project-based unit promoted the learning of children in a first-grade classroom. The children attended a public elementary school located in a southeastern university town in the United States. Approximately 94% of the students in the school were from economically disadvantaged families. No children in this classroom were Caucasian, and most of them came from single-parent households. We compared the children's learning and performance in a teacher-directed science unit on animals versus a project-based unit on chicks. Results revealed that more state-mandated objectives were covered during the project-based unit than during the teacher-directed unit and that children had "more to say" by using more words and expressing more specific and accurate ideas after the project-based instruction. The project also provided more enriched learning opportunities than the traditional teacher-directed unit. Implications for early childhood teacher education are included.

Introduction

This collaborative study was conducted by a first-grade classroom teacher and an early childhood teacher educator. We were interested in exploring whether small modifications made to teacher-directed practices through the adaptation of the Project Approach would promote the learning of children who came from low-income families and were considered at risk for later academic failure. We compared the children's learning and performance in a teacher-directed science unit on animals with a project-based unit on chicks. The goals of our investigation were (1) to see the effects of the two teaching methods on children's learning and (2) to explore how early childhood teachers might utilize project methods for their work with children from economically disadvantaged families.

Theoretical Framework

Contemporary American educators face two primary challenges: first, how to provide high-quality educational experiences for all children, including those from various racial, ethnic, and socioeconomic groups; and, second, how to create meaningful learning experiences in the current political climate dominated by rigid state standards and federally mandated standardized testing.

For years, educators have explored the first of these two challenges and asked how we can help children living in poverty, who often come from racial and cultural minority groups, to be successful in school (Cuban, 1989). Although harsh life conditions are considered one of the great constraints on these children's learning and development, many members of the education community also voice concern about the quality of education provided for these children. Discussing increasing disparities between the rich and the poor, Kozol (1990) argued, "Low-income children, who receive the least at home, receive the least from public education" (p. 49). Pianta and Walsh (1996) also noted, "those children who are labeled as 'at risk' are not well served by this society and its schools" (p. 1).

Classroom studies have shown that learning activities provided for children from economically disadvantaged families are often different from those provided for children from affluent families:

> Disadvantaged students receive less instruction in higher-order skills than do their more advantaged peers. Their curriculum is less challenging and more repetitive. Their teachers are typically more directive, breaking each task down into smaller pieces, walking the students through procedures step by step, and leaving them with less opportunity to engage in higher-order thinking. As a consequence, disadvantaged students receive less exposure to problem-solving tasks in which there is more than one possible answer and in which they have to structure problems for themselves. (Means & Knapp, 1991, p. 283)

A study conducted by Lee (2001; Lee & Walsh, 2004) provided an example of the thinking behind teachers' differential treatment of less- and more-advantaged students. The results of this study, done with a preschool teacher of at-risk children, confirmed that projects are typically considered more appropriate for children who have already mastered basic vocabulary and beginning reading skills and who are from economically privileged families. The teacher in Lee's (2001) study believed that her classroom children needed teaching methods that would effectively teach them many basic skills within a short period of time. This same teacher, as a mother, was very supportive of her own daughter's project work. She, however, believed that projects were a next step or luxury in which her classroom children would be able to participate once they had learned all the basic skills necessary for a deeper level of exploration and understanding. Like the teachers described by Means and Knapp (1991), this teacher's thinking and instructional decisions denied students from low-income families the opportunity to participate in, and learn from, classroom activities such as project work that involve problem solving and promote higher-order thinking.

In contrast, Helm and Lang (2003) argued that using projects for the education of children living in poverty (1) increases their motivation for learning academic skills and the opportunity to meaningfully practice these skills, (2) helps children see themselves "as learners and problem solvers" (p. 20) and develops their self-esteem, (3) strengthens positive relationships between teachers and families, and (4) helps families become aware of resources available in their communities.

During the past two decades, there has been renewed interest in creating active learning environments in early childhood classrooms (e.g., Bredekamp & Copple, 1997), and the Project Approach has provided an extensively developed example of how this might be done (Katz & Chard, 1989, 2000). However, efforts to incorporate project work into learning environments, especially for economically disadvantaged students, have proved difficult for many practicing teachers because of the lack of congruence between active learning strategies and the current political climate that is focused on standards, accountability, and standardized test scores (Geist & Baum, 2005). Unfortunately for teachers interested in trying the Project Approach, many of the articles that have discussed the use of the Project Approach in early childhood classrooms (e.g., Alkon, 2004; Danyi, Sebest, Thompson, & Young, 2002; Elliott, 1998; Gallick, 2000; Goldhaber, 1998; Kogan, 2003; Scully, Howell, & Corbey-Scullen, 2000; Williams, 1997) have done an excellent job of describing both the processes and products of this approach but have not addressed the issues of assessment, standards, or evaluation—the key components of contemporary discourse on accountability in education.

There are, however, some notable exceptions to this trend. Some of the literature has discussed the connection between authentic forms of assessment and instruction that is child centered and inquiry based. For example, in "The Llama Project," Ganzel and Stuglik (2003) showed how rubrics might be used to assess children's participation and cooperation during the investigation, their amount of task-engaged and appropriate behavior, and their level of participation in group presentations. Other educators (e.g., Beneke, 2000; Helm, Beneke, & Steinheimer, 1997) have described how the documentation that is a critical element of the Project Approach is ideally suited for assessing each child's level of development.

A number of researchers have made very explicit the connections between standards (required

goals) and the activities and results of project work. For example, Dixon (2001) presented tables linking standards/proficiencies and project experiences for language arts, math, and science. Helm and Gronlund (2000) also provided a very specific and detailed example of how a group of children meet a state science standard through their project work on a class turtle:

> The documentation shows how children are learning to ask questions about organisms and events in the environment and to plan and conduct a simple investigation ... [and] are well on their way to achieving the kindergarten equivalent of science content standard A, developing the "abilities necessary to do scientific inquiry."

The usefulness of the Project Approach for accomplishing state-mandated objectives was further supported by Schuler (2000), who pointed out that project work simultaneously meets standards in a variety of areas: "State standards are met, not only through the content of the project, but through the processes of investigation and completion of products...."

These authors have shown how project work can support the assessment of children's intellectual development and successfully address state standards, but they have not discussed the evaluation of the Project Approach as a teaching method. Helm and Gronlund (2000) were explicit in their claim that the outcomes of interactive and interconnected educational experiences like the Project Approach can be difficult to assess and evaluate: "During the preschool years and early primary grades, children learn best through active, engaged, meaningful experiences.... These experiences are difficult to assess."

A study by Bryson (1994) did, however, compare children's responses to a teacher-directed thematic unit on dinosaurs with their responses to a project-based unit on frogs. According to the teacher of this first-grade classroom, the children were very excited to find answers to their specific, child-generated questions and to write down the information that they learned during the course of their research on frogs. The teacher reported that the children wrote more about frogs than they did about dinosaurs during the teacher-directed thematic unit on dinosaurs, and they also wrote more about frogs than they did about other subjects during their free writing time.

In this study, we have extended these educators' efforts by examining differences between a teacher-directed unit and a project in terms of classroom practice and children's learning and performance. We compared two different teaching methods to examine what happened in the classroom during these two approaches and what impact each had on the children's academic performance. Doing so, we investigated whether and how a project promoted the learning of children from economically disadvantaged families and considered at risk for later academic failure.

Method

The School

Highlands Elementary School (all names in this article are pseudonyms) is located in a university town in the southeastern United States. The town has a population of approximately 100,000 people and has 13 public elementary schools. In the 2003-2004 school year when this study was conducted, Highlands served 423 students from prekindergarten through fifth grade. The student population was composed of African American (76%), Latino (12%), Caucasian (8%), Asian American (3%), and multiracial (1%) children. The 2003-2004 State Report Card revealed that 94% of the students at Highlands Elementary School were "economically disadvantaged," a term that is determined by free and reduced lunch status. Highlands is a Title I "schoolwide program" school, and because the school did not make "adequate yearly progress" (as defined by the *No Child Left Behind* legislation) for 2 years from 2000-2002, it was

considered to be in need of improvement and in "corrective action" for the year 2002-2003. In 2002-2003 and in 2003-2004, the school did make "adequate yearly progress."

The Classroom

The study was conducted in a first-grade classroom. The classroom had 19 children, including 10 boys and 9 girls. Among them, 13 were African American, 5 were Latino American, and 1 was Asian American. Thirteen of the children in the class came from single-parent homes. The children represented a wide range of ability levels, including 5 children identified as gifted and 1 child identified as having a mild intellectual disability. The classroom teacher, who is the first author of this article, is Caucasian and has a Ph.D. degree. She had spent 30 years in various positions as an early childhood teacher and teacher educator. She taught this group of children in kindergarten and continued as their teacher in first grade.

Data Collection

Although our collaboration started in the fall of 2003, the particular data used in this manuscript were collected for 2 months in the spring of 2004 when the children studied animals. The unit on animals was taught in two parts using two different teaching methods: one was a teacher-directed method and the other a project-based method. To determine how much the children had learned and whether the children's understanding about animals had changed due to different teaching methods, at three different points during the study, the children were asked to complete a worksheet designed by the classroom teacher. The worksheet (see Appendix A) asked the children to name an animal, list where it lives, what it eats, and any other facts that they knew about the animal. The children were also asked to draw and label a picture of the animal that they had chosen. This instrument was administered in April, prior to the beginning of the teacher-directed unit, in May following this part of the unit, and finally in June, following a brief project-based unit on chicks. The first time, the worksheet was given in small teacher-directed groups as a pretest. Following the teacher-directed unit on animals, the children were all asked to complete the worksheet at the same time. The same whole-class method of administration was again used following the Project Approach portion of the unit. The first two times, the children were told to choose any animal that interested them to write about. The third time, the children were all asked to write about the topic of the project—chicks. In all three cases, the children were encouraged to write as much as they could, but when they were finished, they were allowed to do something else.

For our analysis, we also collected worksheets completed and collages created during the teacher-directed unit on animals. When investigating chicks, we documented the children's progress and performance by collecting work samples (e.g., drawings, writings, KWL charts), by taking photos of their work in progress and materials provided for their investigation, and by videotaping the classroom activities.

Teaching Methods

The two different approaches to teaching the topic of animals described in this manuscript were not designed to be exemplary models of how to teach. Rather we wanted to see the similarities and differences in these two methods as they unfolded and as the children were engaged in the learning process. For this purpose, we spent approximately the same number of class sessions on each of the two approaches: teaching animals through a teacher-directed science unit for 8 sessions and the project-based unit about chicks for 9 sessions. The amount of time devoted to the teacher-directed unit was approximately 6.5 hours, compared with approximately 7.5 hours spent on the project-based unit.

In both teaching methods, additional support and resources were available to the classroom

teacher. For example, during the teacher-directed unit, a student intern majoring in science worked with the classroom teacher to plan activities. The intern also collected instructional materials, occasionally taught whole-class lessons, conducted small group activities during each session, and arranged for a guest speaker to bring his collection of insects to the class. As part of the teacher-directed unit on animals, the class took a day-long field trip to a major zoo.

During the project-based unit, the second author, who is a faculty member in early childhood education, consulted and planned with the classroom teacher. The second author, however, did not participate in any teaching activities. Instead, she collected books and materials for the classroom investigation on chicks and documented the children's work in progress by taking notes and photographs and by videotaping. The classroom teacher also received assistance from a math coach who made contributions on two occasions (e.g., bringing baby chicks for the children's observation and exploration; showing various bird eggs and reading a book to the class).

Major differences in the two teaching methods can be found in the way they were planned and the instructional strategies used. Most of the planning for the teacher-directed unit was conducted by the classroom teacher and the science intern prior to the beginning of the unit. Emphasis was placed on making use of information found in the science textbook and on other activities, such as teacher-guided collages and games that were thought to be developmentally appropriate, relevant to the subject, and interesting to the children. Planning for the unit consisted of brief, focused sessions that provided a clear sense of direction for the teacher and the student intern. The intern then collected materials, and the classroom teacher set up the classroom environment as needed. The specific topics covered during this phase were types of animals (mammals, reptiles, etc.) and insects. A detailed description of classroom activities can be found in Appendix B.

In contrast, the planning for activities using some of the principles of the Project Approach was ongoing, recursive, improvisational, and challenging. For example, at the beginning, the classroom teacher intended to do a project about one of the animals that the children had seen at the zoo. When the second author suggested choosing an animal that the children could observe and revisit easily for their investigation, the planning process returned to the beginning to find an animal that interested the children and that they would have easy access to over time. We found that during this same time period, the math coach was bringing baby chicks to some of the other classes in the school to be weighed and measured. The classroom teacher asked if her class could be included, and with the math coach's okay, the project on chicks began. Planning for activities based on the principles of the Project Approach, however, continued to be based on the questions the children asked and the things that provoked their curiosity. For example, the focus of the project evolved into the relationship between eggs and chicks (and other animals that hatch from eggs) rather than on how the chickens moved or grew, etc. Thus, planning, though often brief, had to be done on an almost daily basis, and only in retrospect was it possible to have a clear vision of the overall project.

Differences between the teacher-directed unit and the project-based unit are also evident in the instructional strategies that were used. While both methods made regular use of whole group instruction (e.g., reading and discussing books) and whole group questioning (e.g., eliciting questions from the children), the teacher-directed method relied heavily on small groups engaged in activities guided by the teacher, and the Project Approach made use of a much broader array of classroom activities. Additional activities during the Project Approach unit included direct investigation of materials (e.g., watching and touching chicks, examining eggs), drawing pictures to document what they saw, looking through books to find information and answer specific questions, creating graphs of information (e.g., weight of baby chicks), making comparisons between the height and weight of chicks and other objects (e.g., blocks) in the classroom, and conducting experiments with eggs. Table 1 summarizes the instructional components of the two teaching methods.

Table 1
Comparison of Instructional Components for a Teacher-Directed Unit and an Adaptation of the Project Approach

	Teacher-Directed Unit	Project-Based Unit
Time Span	April 13–May 11	May 14–June 10
Number of Sessions	8	9
Approximate Amount of Time	6½ hours	7½ hours
Teacher Support	Science intern from the university for planning in most sessions	Early childhood faculty for planning in most sessions. Math coach for materials and teaching 2 sessions.
Style of Instruction	1. Whole group instruction (read books, etc.) 2. Whole group questioning 3. Regular, stable small groups in teacher-directed activities such as games, collages, and reading the textbook 4. Field trip and guest speaker 5. Watch video	1. Whole group instruction (read books, etc.) 2. Whole group questioning 3. Investigate materials (look at the chicks and eggs) 4. Draw pictures to document experiences 5. Use resources to answer questions (look through books) 6. Create graphic representations (graphs) of information 7. Make comparisons 8. Conduct experiments
Additional Resources Used	Access to zoo Access to a guest speaker	Access to baby chicks and various kinds of eggs
Teacher Planning	All done in advance	General planning preceded the unit, but specific plans were reassessed after each session.

Results

Number of Words and Thoughts

Children's answers to the free response question on the teacher-designed worksheet were analyzed for the number of words and the number of thought units. As seen in Table 2, the number of words did not differ appreciably from time A (pretest) when the mean number of words was 8.4, to time B (posttest after teacher-directed unit) when the mean number of words was 7.9. However, following the project-based unit, the mean number of words in the free response question was 22. Similarly, the mean number of ideas was 1.6 and 1.7, at times A and B, respectively, while the mean number of ideas at time C was 3.3.

Table 2
Children’s Responses to Free Response Question about Animals*

	No. of Words	No. of Words	No. of Words	No. of Thoughts	No. of Thoughts	No. of Thoughts

Child	A	B	C	A	B	C
Annie	18	14	---	3	2	---
Andrew	3	14	26	1	3	2
Angel	11	5	18	2	2	3
Brandi	14	16	---	4	3	---
David	5	6	24	1	2	2
Harold	6	7	17	2	2	5
Jackie	13	9	16	2	2	3
Kiley	5	---	17	1	---	3
Ken	4	2	20	1	1	4
Lana	11	8	53	2	1	9
Max	7	12	25	2	2	3
Mitchell	8	---	20	1	---	4
Paul	7	4	17	1	1	2
Sally	0	3	19	0	1	2
Sylvia	6	8	18	2	2	3
Tracy	13	0	42	2	0	4
Theodore	18	11	15	2	2	2
Yonnie	3	---	5	1	---	1
Total	152	119	352	30	26	52
Divided by *N* of	18	15	16	18	15	16
Mean	8.4	7.9	22	1.6	1.7	3.3

*A = pretest before start of units April 13, 2004; B = posttest after teacher-directed unit May 11, 2004; C = posttest after project work June 10, 2004.

Because of the small sample size, a nonparametric test—the Wilcoxon signed ranks test—was used to assess the significance of the difference between the scores on the three administrations of the teacher-designed worksheet. The descriptive statistics for the sample are shown in Table 3, and the statistical results are shown in Table 4. As indicated in Table 4, when the pretest (time A) is compared to the test following the teacher-directed unit (time B), there is no significant difference in either number of words written or number of thought units. However, there are significant differences between the test at time C (following the project-based unit) and both time A (the pretest) and time B (the test given following the teacher-directed unit) for both number of words and number of thought units. These data would suggest that the Project Approach provides children with the opportunity to construct knowledge by becoming more engaged with the information and thus having more to say.

Table 3

Descriptive Statistics*

	N	Mean	Std. Deviation	Minimum	Maximum
Number of Words at Time A	18	8.44	5.193	0	18
Number of Words at Time B	15	7.93	4.758	0	16
Number of Words at Time C	16	22.00	11.219	5	53
Number of Thoughts at Time A	18	1.67	.907	0	4

Number of Thoughts at Time B	15	1.73	.799	0	3
Number of Thoughts at Time C	16	3.25	1.844	1	9

*A = pretest before start of units April 13, 2004; B = posttest after teacher-directed unit May 11, 2004; C = posttest after project work June 10, 2004.

Table 4
Paired Test Comparisons

Paired Groups	*Z* (2-tailed)	*p*-Values
Words A – Words B	-.967	.333
Words A – Words C	-3.390	.001 **
Words B – Words C	-3.186	.001 **
Thoughts A –Thoughts B	-.264	.792
Thoughts A – Thoughts C	-3.349	.001 **
Thoughts B – Thoughts C	-2.654	.008 **

A = pretest before start of units April 13, 2004; B = posttest after teacher-directed unit May 11, 2004; C = posttest after project work June 10, 2004.

*$p < .05$; the difference between the two tests is significant.

**$p < .01$; the difference between the two tests is very significant. A = pretest before start of units April 13, 2004; B = posttest after teacher-directed unit May 11, 2004; C = posttest after project work June 10, 2004.

The Specificity and Accuracy of Thoughts

The free response question was also analyzed for level of detail, specificity of the response, and the accuracy of statements. Although each child did not exhibit improvement in each area, the majority of the children showed a positive change in at least one area. In the first two sets of responses collected at time A and time B, children tended to focus on their general feelings for or interactions with animals (e.g., "I like lions." "We play with my dog." "My fish loves me."); whereas in the final set of responses collected at time C, the children described specific things that they had observed or learned about chicks (e.g., "They eat the yolk and worms." "They walk zig-zag." "They push their way out of the shell with a special tooth on their beak."). More-thorough examples of some children's responses at each point in time are provided in Table 5.

Table 5
Examples of Text Elaborations per Child per Testing Session

Child	Time A—Pretest	Time B—After Teacher-Directed Unit	Time C—After Project Approach
Sylvia	"moky acts cazey. Toey say ooo ooo hooo."	"He haug of The tree. They say hoo-hoo-hw-hw."	"it wolks zeg zag. They have more feet then we do. When we had them they wolk away."
David	"I like playing with It."	"They runs firt. They eat firt."	"When it come out of the egg Thay punch the egg al around the egg. When thay 21 days old thay get yellow."
Angel	"They like to Borck so much. and They is so small."	"It's White It eats carrots."	"They eat yolk in they eggs. they get out with a toth on they beak and push out."

Ken	"It eat cat food"	"I name is nshsher"	"they eat warms and yolk the white stof to prnterc [protect] it They eat yolk to come out of the egg"
Theodore	"I like lins bescese I like It and I like Im Thay are nis and Thay are Good"	"My animal is bad It eats pepul and thay dno't like Lino"	"Wen you srim [scream] he hort [heart] bep [beats] he srim to The chick is a good chik"

Enriched Learning Opportunities

Our observations of children's work also confirmed that project work provided the children with ample opportunities to learn and develop in four areas. First, children were encouraged to articulate their thoughts through different means, such as discussions, writings, drawings, and constructing models. Second, children were able to develop questions for their investigation and learning by reflecting on things they wanted to know (e.g., "Can [chicks] swim when they grow up?"), information they found (e.g., "Chicks walk on their legs—funny, zig zag."), and new questions to ponder (e.g., "Why are [chicks] scared of loud children?"). Third, the children utilized their prior experiences and made connections (e.g., During the project on chicks, a Spanish-speaking girl, who rarely initiated conversations, told the second author, "My dad works with chickens."). Finally, the children had the opportunity to work collaboratively with their peers to achieve a shared goal (e.g., working with a partner to measure the weight and height of a chick and count the number of corresponding blocks, finding information from a book with a peer who speaks English as a second language).

Meeting State Standards

A wider variety of state-mandated objectives (see Table 6) were addressed during the project-based unit (6 science, 6 language arts, and 2 math) than during the teacher-directed unit (4 science and 3 language arts). The first-grade curriculum map for the school required a unit on animals in the spring, and four of the science objectives were based on a study of animals. Thus, animals were chosen as the basic topic, but specific classroom activities were not designed to meet individual, specific state curriculum objectives during the planning for either unit. After the conclusion of both units, the classroom teacher reviewed all work that had been done and correlated both the pre-planned and emergent activities with the curriculum objectives. Thus, the finding that more objectives were covered during the project phase would appear to be an indication of the power of such an approach.

Table 6

State-Mandated Curriculum Objectives Addressed by Each Teaching Unit

Mandated Objectives	Teacher-Directed Unit	Project-Based Unit
Science QCC's (State-Mandated Curriculum Objectives) Addressed	#2 Uses books and other media to obtain information related to science concepts. #11 Compares and describes different animals in the ways they look, grow, and move: such as tadpoles, caterpillars, kittens, puppies, colts, chicks, snakes, sharks, opossums, and eagles. #12 Compares various animal groups and how they are alike and different. Identifies groups of animals that have similar characteristics and names the characteristics. #14 Compares young animals with their parents	#1 Asks questions, makes and keeps simple records of observations, sorts and classifies objects, communicates with others, makes predictions, uses estimation and measurement, and makes sketches and diagrams to explain ideas. #2 Uses books and other media to obtain information related to science concepts. #3 Identifies and practices accepted safety procedures in manipulating science materials and equipment. #4 Actively engages in the learning process via

	and other types of young animals. Identifies and matches young animals with their parents.	hands-on/minds-on science activities and experiences. Uses appropriate tools to collect and analyze data and solve problems. #11 Compares and describes different animals in the ways they look, grow, and move: such as tadpoles, caterpillars, kittens, puppies, colts, chicks, snakes, sharks, opossums, and eagles. #14 Compares young animals with their parents and other types of young animals. Identifies and matches young animals with their parents.
Math QCC's (State-Mandated Curriculum Objectives) Addressed		#19 Compares weight of two real objects (heavier than, lighter than) and capacity of two real containers (more than, less than) using both dry and liquid measure units, and compares the height of two real objects (shorter than, taller than). #34 Interprets data by reading bar graphs and pictographs using whole unit data.
Language Arts QCC's (State-Mandated Curriculum Objectives) Addressed	#12 Reading: Increases vocabulary to reflect a growing range of interests and knowledge. #27 Reading: Demonstrates comprehension when reading a variety of literary forms (e.g., fiction, nonfiction, poetry, and drama). #50 Reference/Study: Uses easy fiction books, nonfiction books, various audiovisual resources, and software as information sources.	#12 Reading: Increases vocabulary to reflect a growing range of interests and knowledge. #21 Reading: Recognizes explicit main ideas, details, sequence of events, and cause-effect relationships in fiction and nonfiction. #27 Reading: Demonstrates comprehension when reading a variety of literary forms (e.g., fiction, nonfiction, poetry, and drama). #50 Reference/Study: Uses easy fiction books, nonfiction books, various audiovisual resources, and software as information sources. #32 Writing: Uses correct spelling for frequently used sight vocabulary. #34 Writing: Writes a minimum of three sentences about a topic.

Discussion

Consistent with previous work in this area, our study shows that project work can be used to meet state-mandated curriculum objectives. Other educators (Helm & Gronlund, 2000; Schuler, 2000) have demonstrated that standards can easily be met using the Project Approach, and Dixon (2001) found that even some standards that had not been included in the original plan were addressed when the Project Approach was implemented. The results of our study support these earlier results and, in addition, indicate that a wider variety of standards are met using the Project Approach than using more teacher-directed methods of teaching. These results reveal the

potential of the Project Approach as an efficient way of meeting the demands and requirements imposed on today's classrooms.

Our brief exploration of the Project Approach also provides evidence that children become more engaged and perform at more-advanced academic levels when involved in active, meaningful, and connected educational experiences. The results indicate that children have "more to say," both quantitatively and qualitatively, after having participated in a unit of study based on some of the principles of the Project Approach.

These benefits are notable especially because the use of the Project Approach described in this article was so brief and represented only a small portion of the teaching and learning that went on in the classroom that year. In this regard, our exploration of the Project Approach is in accordance with the idea that projects and other methods of teaching are not mutually exclusive. Katz and Chard (1989, 2000) emphasized that projects can be complementary to systematic instruction. Geist and Baum (2005) also asserted, "projects are compatible with other curricular approaches, [and] can complement or expand and support other classroom activities" (p. 32). Therefore, a teacher who chooses to use the Project Approach does not need to feel that she or he must "give up" all other modes of instruction. A teacher might choose to use the Project Approach only for certain topics, or at certain times of the day, or at certain times of the year, and could incorporate a small number of projects (perhaps one or two per semester) as additions to the current curriculum. This strategy might involve conducting a project on a science or social studies topic during the last two or three weeks of each grading period or setting aside one or two afternoons per week for project work.

Finally, our attempts to adapt the Project Approach to a single unit of study in a first-grade classroom also show that this method does not have to be "mastered" by the teacher before it can offer significant benefits to children. Rather than feeling that only an expert can do project work, the advice of some experienced teachers is to, "Start small. Let [the project] build on itself" (Berry & Allen, 2002). Similarly, these same authors make it clear that it is not necessary, or maybe even possible, to have the project fully planned in advance. When teachers attend to the interests of the children and are responsive to the children's ideas and questions, the project will proceed as it should, and it will appear as if the teacher "had planned the project from beginning to end" (p. 2). This is exactly what happened in our attempt to adapt and implement the Project Approach. We began with a very simple idea, changed our plans as needed, and followed the course dictated by the children. The result was an investigation that had many of the elements of the Project Approach, but more importantly, the result was an educational experience that was engaging and successful for the children.

Because this study was initiated, organized, and conducted by a classroom teacher in collaboration with a university faculty member, the primary strength of this study is that the results have direct relevance to the practice of other early childhood educators. However, the interpretation of the results may require some caution because the research was subject to a variety of confounding variables. For example, it is possible that the increase in children's words and thoughts was not caused by a change in teaching method but was simply the result of the cumulative effect of 17 weeks of study about animals, or the result of practice with the worksheet. Yet, the dramatic nature of the change in children's responses makes it unlikely that the change was simply the result of "more of the same" and thus leads us to suggest that it was caused by the qualitative difference in teaching method. Future research will need to be designed to explore the possible impact of practice and cumulative study by varying the timing of project-based instruction and by varying the assessment measures used.

Conclusions

Learning through projects is not a new idea (Katz & Chard, 1989, 2000). It was advocated during the Progressive Education Movement in the United States. Kilpatrick's (1918) article, *The Project Method,* attests to this historical root. He articulated that a project as "the hearty purposeful act"

(p. 320) could be used to actualize the ideal that "education is life" (p. 320) and not a mere preparation for later life. He argued that educational experience should have a resemblance to the worthy life, which consists of the "purposive activity" (p. 322). Katz and Chard observed that the Project Approach is similar to the Bank Street model developed at the Bank Street College in New York. Yet, this idea was used most extensively in early childhood classrooms in other countries, such as the British Infant Schools in the 1960s and 1970s (Helm & Katz, 2001) and the Reggio Emilia schools in Italy, which have received international recognition during the past two decades (Edwards, Gandini, & Forman, 1998).

Despite the long historical tradition and strong theoretical support for the Project Approach, many American teachers today do not use this method in their classrooms (Geist & Baum, 2005). Teacher educators who are interested in encouraging the use of the Project Approach need to understand that teachers may hesitate to use the approach for a variety of reasons, only one of which may be the perceived difficulty of teaching this way. For example, teachers may be resistant to a change that feels like a critique of their current teaching and a threat to their identity (Walsh, Baturka, Smith, & Colter, 1991). As Katz and Chard (1989, 2000) have warned, we as educational researchers have a tendency to polarize different approaches to teaching, which may cause teachers to hesitate or resist making changes. Examples of polarizing rhetoric can often be found in the literature, including the following statement: "There is little that NAEYC recommends [as developmentally appropriate practice] that looks like the traditional, adult-centered model of formal teaching and learning" (Hart, Burts, & Charlesworth, 1997, p. 31).

Rather than contributing to a polarizing discourse, it is possible to view the Project Approach as a variation (albeit a significant one) on many existing teaching practices. In this article, we did not attempt to showcase "an exemplary project." We instead provided evidence that children's writing improved as a result of relatively brief changes made to traditional teaching practices. The idea that some small innovations can have important results is especially compelling given the demands on teachers' time, the current emphasis on accountability, and what is often perceived as teachers' fear of change.

Providing high-quality education for every child is our ultimate task as educators. Pianta and Walsh (1996) have argued,

> Children who depend on schooling for all their formal education must be challenged and nurtured intellectually beyond what their more fortunate peers may require. What they do not have access to in schools, they are unlikely to have access to elsewhere. (p. 4)

Children from less-privileged backgrounds should receive instruction in fundamental skills and, perhaps more importantly, should participate in educational experiences that motivate them and provide them with the opportunity to engage in higher-order cognitive processes. Our study has shown that children from economically disadvantaged families can benefit from educational experiences based on the Project Approach. The children in our study improved their writing skills as they participated in open-ended, active learning strategies based on inquiry and collaboration. Our research thus supports similar results from other studies showing that the Project Approach can be a powerful method for accomplishing a wide range of educational objectives even with the current emphasis on standards and accountability.

We would encourage classroom teachers to "try out" the Project Approach, using it in their classrooms when, where, and in ways that work for them. We reiterate that the Project Approach should be presented as part of a continuum of possibilities rather than as "the" teaching method to be mastered and implemented. Our study shows that every little bit helps, and we would hope that by using the Project Approach in small and idiosyncratic ways, teachers and children may well be empowered to see education as a way of living a purposive and meaningful life.

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Appendix A
Worksheet about Animals

Name _____ Date _____

1. My animal is a _____
2. It lives in _____
3. It eats _____
4. Write all the other things you know about your animal:

On the back, draw your animal and label all the parts.

Appendix B
Detailed Description of Classroom Activities for Teacher-Directed and Project-Based Units

Pretest (two sessions) Administered in small groups (two each day), while the remaining children participated in "play" centers (watercolor painting, manipulatives, etc.)	
Teacher-Directed Unit (eight sessions)	
Session 1	Introduction—student intern read the book *Animal Dads* and introduced types of animals (mammals, reptiles, amphibians, birds, and fish) by example and then listed characteristics of each. Children attended two of four small groups: 1. shared reading and discussion of lesson in textbook on types of animals (teacher led) 2. make collage/chart of different types of animals (teacher led) 3. play game about types of animals (teacher led) 4. coloring sheets of animals (independent work)
Session 2	Children attended the remaining two groups from the previous session.
Session 3	Short session—whole class wrote a list of questions about the upcoming field trip.
Session 4	Field trip
	Introduction about insects and the parts of an insect

Session 5	Children attended two of four small groups: 1. shared reading and discussion of lesson in textbook on insects (teacher led) 2. make and label a picture of an insect (teacher led) 3. play animal quiz game (teacher led) 4. coloring sheets of insects (independent work)
Session 6	Visitor from university brings insects to show.
Session 7	Children attended the remaining two groups about insects.
Session 8	Whole class discussed (and teacher wrote) what they had learned. Watched a video about animal mothers and babies. Administered assessment.
"In-between"	Whole class contributed questions about zoo animals.
Project-Based Unit (nine sessions) (Please note: the following list of session activities does not indicate the extent to which the children's questions provided the direction for the activities.)	
Session 1	Discussed animals we can see and study—made list of things we "know" and "wonder" about these animals.
Session 2	Made list of questions about chicks. Read two books about chicks. Brought in chicks for children to hold and observe.
Session 3	Children measured the chicks. Children drew pictures to record their experiences. Math coach brought in different types of eggs for the children to look at.
Session 4 (short session)	Children looked at pictures of eggs. Read book about eggs.
Session 5	Using the children's measurements from a previous session, we graphed the length and weight of the chicks. Observed and drew chickens.
Session 6	Compared classroom objects to height and weight of chickens. Did an experiment with eggs.
Session 7	Read and discussed a book about eggs and chicks. More egg experiments and drew pictures of the inside of eggs.
Session 8	In spontaneously formed small groups, children read books about chicks to look for answers to their questions.
Session 9	Reviewed questions and answers.
Administered final assessment.	