Revitalizing Language Arts Instruction Through Inquiry Projects

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ABSTRACT

This descriptive narrative presents a university/school partnership that led to an inquiry-based approach to language arts instruction, resulting in increased opportunities for reflective teaching and learning, students' environmental awareness projects, the integration of science, and the individualization of instruction at the middle school level.

AUTHOR BIOGRAPHY

Dr. Robertson is an Associate Professor in the Department of Human Services and Counseling, Literacy Program, in the School of Education at St. John's University. Her current research explores students' perception of self-efficacy and early reading and writing development, and the integration of inquiry based instruction and action research projects to support students' critical thinking in the elementary grades.

Introduction

Improving teaching and learning tops current reform initiatives, and classroom contexts have been reconfigured to meet federal and state mandates for increased student achievement through explicit, systematic, and evidence-based teaching and assessment. To address these goals, some districts have sacrificed enrichment activities such as fieldtrips, to devote more time to "test prep." Preparing students for the "one right answer" on a standardized exam just doesn't make sense. Involving students in problem posing activities with real world applications that promote their critical thinking, literacy development, and sense of global stewardship (Caine & Caine, 2007; Clyde, Miller, Sauer, Liebert, Parker, & Runyon, 2006; Freedman & Johnson, 2004; Berghoff, Egawa, Harste & Hoonan, 2000), prepares them for the substantial demands they will face in the 21st century.

This article frames a year-long inquiry project that integrated language arts, science instruction, and inquiry work to support fifth-graders abilities to analyze, problem solve, and persuasively write. Field notes describing students' questions and concept development; descriptions of individual and group projects; photographs; students' writings, drawings, and sketches; make visible a student-centered and teacher-guided integrated approach that enabled students to problem-pose and problem-solve, apply theory to real world applications, and to convey their thoughts through writing and oral presentations.

Theoretical Background

Inquiry or Project Approaches to Instruction

The project approach is a method of teaching in which an in-depth study of a particular topic is initiated and explored by a student or a group of students over an extended period of time (Katz & Chard, 1989; Trepanier-Street, 1993). Inquiry projects are usually initiated from the child's point of view or question about events and happenings in their world. During student inquiry projects students make on site visits to further stretch their thinking. They take field notes, draw, and write notes while on site, take stock of their own learning, and plan future explorations. Students rewrite and reconstruct as their knowledge base continues to grow. They explore topics that are self-selected and of interest to them. Teachers structure and support individual or small groups of students to fine-tune their questions, to locate resources that will help them find answers to these questions, and to formulate theories about what it all means in their world. Students use a variety of resources to extend their inquiries. These resources might include web quests, interviews, or conversations with experts.

Ethnographic Research

Ethnographic research is "an approach to the study of everyday life that is driven by cultural theory" (Zaharlick, 1991, p. 205). Rooted in anthropology, such explorations focus upon the social nature of learning to describe and understand the ways participants in a discourse community construct meaning and make sense of their daily experiences. Ethnographic researchers immerse themselves within a culture to gain "emic" understandings about the ways shared values, beliefs, and practices are constructed by community members. Ethnography is an interactive, reflexive, and interpretive research process. This narrative describes the culture of a fifth-grade inquiry project that took place during 2004-2005. The location of this inquiry, at the Sands Point Preserve on the Long Island, New York, enabled this group of students to appreciate the fragile nature of the earth's ecosystems and their collective responsibility to protect it.

Methodology

Participants

In August of 2004, I[i] conducted an exploratory meeting with school administrators, teachers, as well as a community representative to discuss the possibility of university partnership to utilize the Sands Point Preserve as an "outdoor classroom" and site for student inquiry.[ii] A mutual agreement was formed and tentative plans for the following year were developed that matched each teachers' objectives for instruction. In September, before the first fieldtrips, I conducted focus group discussions with interested teachers (8-10) to explore ways to integrate language arts with an inquiry approach.[iii] During subsequent meetings over the 2004-2005 year, I provided planning resources and guidance to this teacher cohort. I accompanied their classes on most fieldtrips to the Preserve offering feedback and suggestions. Ultimately, however, it was only the fifth grade teacher, Ms. DePerto, and her 22 students who were able to successfully envision

and implement an inquiry project. Therefore, the following narrative represents her class's story.[iv]

Research Questions

The first purpose of this study was to determine if a long-term inquiry approach could be successfully integrated with language arts and science standards for instruction, as outlined by New York State. The second purpose was to determine if integrating inquiry work significantly increased students' motivation to learn, their meta-cognitive awareness, and their sustained involvement with literacy tasks over time. The final purpose was to explore under which instructional conditions families would feel comfortable participating in their children's inquiry projects.

Design of the Study

The design of this study is emergent and based upon grounded theory (Glaser & Strauss, 1973). Theories were inductively developed over the course of the fieldwork as notes and literacy artifacts were reviewed, reread, sorted and resorted into domains of analysis. This article highlights and describes the three phases of this year-long endeavor, the ways students processed and presented their theories, recommendations, and plans for improving the ecology and habitats of the Sands Point Preserve, and the ways project work promoted students' critical thinking, speaking proficiency, and written expression.[v] Vignettes are included to enrich the narrative and make visible moments of teaching and learning.

Phase One: September to November, 2004

Several fieldtrips were taken to the Preserve between September and November of 2004 to familiarize the fifth-graders with the terrain and animal habitats, and to generate enthusiasm for the inquiry projects they would complete. The teacher and I, as well as an expert in the Preserve's history and unique features as a wildlife sanctuary,[vi] accompanied the children through the marshy pond areas, shoreline, and trails. We did a lot of listening in these early months to find out what they children knew, and inserted a few guiding questions to further clarify our impressions. We tried to fine tune that "third ear" that would enable us "to hear the implied meanings of children's words" (Forman and Fyfe, 1998, p.245).

I watched the students chat, skip stones, and collect shells as the teacher guided them along the shoreline that first day. They eagerly searched for sea glass (sand tumbled and polished pieces of glass) smoothed by the waves (Figure 1). These treasures were placed in large plastic bags to transport back to the school for display and further analysis. Students were highly motivated and engaged in these initial explorations. Some of them took photographs, while others jotted down notes or drew pictures in their science journals. To sustain and to support their critical thinking Ms. DePerto asked focusing questions while walking on the nature trails and beach. For instance, to make

Figure 1. Fifth graders visit the Preserve in September of 2004

the students aware of negative influences upon the ecology of the Long Island Sound she drew their attention to the oil barges just off shore and the lifeless horseshoe crabs on the beach.

Throughout these initial fieldtrips,[vii] the teacher and I were excited about the potential of this approach and the ways the fifth graders would connect scientific theory to real world settings. We talked about the schematics, renderings, models, and written pieces they could create. We brainstormed our ideas on large chart paper in workshops with the students. Our biggest challenge, however, in these first months was defining what a student inquiry project would look like. We were certain that the students could problem pose, but, could they problem solve as well? If so, how might we support their conceptual development? We decided that our goals needed to be realistic and that students' final projects should reflect their true understandings. We also agreed that the fifth graders needed more guidance and structure to develop their projects.

Throughout October and November, Ms. DePerto asked her students to clarify their thinking by revisiting their preliminary research questions. Students read extensively online and off, searched Google and Ask websites, had conversations with Preserve environmentalists to find answers to the questions they formulated and reformulated at the Preserve. They wrote and rewrote as their knowledge grew. To

supplement their research, Ms. DePerto utilized video streaming to show clips related to the topics they studied.[viii] Through sustained inquiry they developed an awareness of the social and environmental issues facing anyone who sought to affect change at the Preserve. For example, when discussing improvement plans for a new walking trail this group began to ponder the life forms they would extinguish in the renovation process (Figure 2).

Figure 2. Students consider life inside a dead tree.

The fifth grade teacher collected, assessed, and evaluated students' work in individual and group conferences throughout this period. She began to communicate to the students (and to parents) the format of their culminating display (a town forum) to showcase their efforts in June. Simultaneously, her fifth graders' project ideas, photos, and even drawings were submitted to county executives in an effort to secure grant money for the Preserve to expand educational resources. Their collective voices were beginning to be heard.

Phase Two – December, 2004 - March, 2005

As the winter approached in mid-November, field trips became less frequent. Students continued their explorations, however, in the Preserve's indoor facilities. They remained on task and enthusiastic during this period. Small groups of five to seven students were formed in early December, and topics were teased out that matched the existing curriculum in science and language arts and reflected students' areas of inquiry. Inquiry projects revolved around five topics: The ecology of the pond; pollution; shoreline erosion; nature trails; and, alternative energy sources. To sustain and extend students' motivation and in-depth study of their topics, Ms. DePerto integrated their work at the Preserve with the annual science fair in January. In this forum, the fifth graders

had their first opportunity to present and to articulate their preliminary plans for the models they would construct in the spring.. They explained the purposes, hypotheses, materials, and procedures they would use to actualize their inquiry at the Preserve. The results and conclusions, they added, were to be completed after they built their actual models and conducted their experiments in May.

Phase Three – April to June, 2005.

When students returned to the Preserve in the spring, Ms. DePerto asked them to literally and figuratively fine-tune their observational powers, thereby taking their analysis to another level of scrutiny. Armed with instamatic cameras, they snapped instances or objects that reflected their topic of inquiry. In Figure 3, you see one such example of a student's focus upon the seawall.

Figure 3. Student documentation of seawall erosion.

Exercising the mind and the body.

Throughout the inquiry project research at the Preserve, ample time was provided for free play. These times invigorated and sustained the students in their projects, and enabled them to focus their attention upon the tasks they were required to complete for their projects. This exploration enabled me to see its benefits of unsupervised, open-ended play in natural settings for the middle school student as well. Many of the students' best ideas came to them away from their classroom desks.[ix]

During this final phase, Ms. DePerto teacher held conferences with each of the groups to clarify her objectives for the inquiry projects. This reeling in, grounding, and

release of responsibility to group members was effective in stabilizing the fifth graders' creative energies and endeavors (See Figure 4). The teacher discussed with each group the materials they would need to construct their models in May. They were encouraged to look at home for many of the items, and a fund was set aside to purchase supplies for the students should they need it. Parents were assigned specific groups to work with, and given instructions about the nature and purpose of students' tasks at the Preserve.

Figure 4. Ms. DePerto's on site conference with a group of students.

"It's my same curriculum," Ms. DePerto told me, "but the kids are doing the teaching." It was clear that she had internalized the exact fit between the curriculum, students' inquiry projects, and her role in supporting their growth and development in the research process. She guided the students with "fact sheets" to jot down their hypotheses, inferences, predictions, and investigations. Her goals for this activity were closely aligned with the follow New York State Standards for Science: Identifying questions that could be answered through scientific investigations; designing and conducting a scientific investigation.; using appropriate tools and techniques to gather, analyze, and interpret data; developing descriptions, explanations, predictions, and models using evidence; thinking critically and logically to understand the relationship between evidence and explanations; recognizing and applying alternative explanations and predictions; and communicating scientific procedures and explanations

Data Collection, Analysis, and Results

Vignettes describing two student projects designed to combat pollution and improve the ecology of the Long Island Sound will be the focus of analysis. Katie and Colleen partnered in their exploration of the effect of pollution upon the horseshoe crabs (Figure 5). Each girl kept a journal tracking the evolution of her thinking through illustrations and written explanations.

Katie's and Colleen's Science Notes

The following excerpt comes from Katie's notes.

"On my trip to the Preserve I noticed many horseshoe crabs washed up on the beach. They were all broken in pieces. I figured out what was causing this. My theory is pollution. Many washed up cans, parts of boats, food, and even sneakers were all over the beach. I think these materials are polluting the water and making it unsanitary for horseshoe crabs to survive…My second theory isn't about their habitat, it's about their food. If the pollution isn't affecting the horse shoe crabs alone it is possibly affecting their food…I will have to research their meals each day. If that isn't the theory then it could have notion to do with pollution! I also noticed oil leaking into the water. After finishing my first experiment I will have to investigate my other theories."

Figure 5. Katie and Colleen examine the quality of the water they collect from the Long Island Sound.

Colleen wrote in her notes, "So far I went to the Sands Point Preserve two times. The first time I went I noticed there were about forty dead horseshoe crabs…Horseshoe crabs have been around for a really long time and if they die out that is not good. That's why I am trying to save them."

The girls describe their plans:

"Our plan is to collect different materials such as two fish tanks, two horseshoe crabs, a bucket of water from the Sands Point Preserve and a bucket of fresh water mixed with salt. We am planning to create a habitat for each horseshoe crab…We will prove our theory when the project is completed. If the one with water from its natural habitat dies then my theory our correct and we will have to enforce rules at the preserve and come up with other ideas to prevent this."

Their list of construction materials was simple: two plastic tanks, two small crabs, two wood pikes, two 2' by 2' pieces of wood, and non-toxic blue paint. Their directions were equally as simple:

"Fill one of the tanks with dirty water from the Sound. You may also want to put some garbage in it to represent pollution. Then under the tank, write a sign that says 'This is what happens when you don't take care of the Sands Point Preserve.' Fill the second tank with clean water and say, 'This is what happens when you take care of the Sands Point Preserve.' You will notice that there will not be a dead horseshoe crab in the clean water tank. Suggest ways to keep the water clean. Possible ideas: garbage cans, recycling bins, etc."

Conor, Michael, and Domenick's "Garbage Disposal 3000"

Connor, Michael, and Domenick focused their attention upon pollution in the Long Island Sound caused by oil spills. Their group's project revolved around the creation of a boat equipped with a solar powered engine and its own garbage disposal unit. They named their idea the "Garbage Disposal 3000." They wrote, "Oil spills can kill lots of creatures like fish and birds. We want to stop that from happening." Connor presents a visual argument for adoption of his group's invention in Figure 6.

Figure 6

Connor, Michael, and Domenick outlined the procedures to build the solar powered Garbage Disposal 3000. The materials for construction of the engine were simple; a cardboard box, tin foil, scissors, and tape. The boys write:

"To make a model of a solar powered engine, you need a toy boat, tin foil, and a cardboard box. First you cut four rectangular pieces from the cardboard box. Then take the tinfoil and cover the four rectangles. After, you take the four covered rectangles and attach them to the back of the boat. Finally, you have a solar powered engine! The solar panels will attract sunlight and transfer the energy into electricity."

Directions for the Garbage Disposal 3000 were as follows:

"You'll need these materials, a long cardboard rectangular shaped box, two pieces of long wood, and a drill. First, you'll need to drill holes on the tip of the long wood. Next, you attach the part of the wooden pieces with no holes at the end of the cardboard box. That is where the water will flow through. The garbage will not get through the holes in the wood, but the water will. The garbage will go into the cardboard."

In Figure 7, the boys use the materials and directions they specify in their instructions. Their efforts were focused throughout, and I listened to their explanations of the ways they hypothesized their invention would work.

"When garbage gets in it there," Michael explained, "and the water goes through the mesh and it is filtered back into the water. Our solar power engine decreases the amount of oil used by boats."

"It also decreases the amount of oil in the water," Connor added.

"The solar powered engine saves on electricity," Domenick stated.

Figure 7

Finally the big day arrived, and the students prepared to present their projects to family, friends, and community members at their town forum. They had practiced their speeches with each other, and to ensure good attendance posted flyers and distributed personal invitations. They were not to be disappointed. The turn out was fantastic, and a small group of parents brought desserts and beverages for the presenters and guests.

When asked by a local reporter that day how her students got their ideas for the projects, Ms. DePerto proudly stated, "They came here, found problems, and worked hard on finding solutions. As their science teacher I am thrilled that the students were able to apply the principles they learned, such as the scientific method, and to explore in depth subjects covered in class."

Figure 8. A local newspaper photographer captures students' presentations.

In the reporter's article, entitled *"Students not only study problems, but suggest solutions,"* he cited several of the students.

"Most of the horseshoe crabs are dead because of the garbage in the water," Colleen explained. She continued to describe the ways crabs were valuable for developing medicines and for eye-care research.

Michael showed the piping system he designed to reduce the algae in the pond, which he stated threatened both animal and plant life. "It was good to learn about this," he added. "It was also fun to do."

"It's good that we can find ways to help," Jack added.

"It's a beautiful place and we want to preserve it," said Elizabeth.

"Everyone got to work together," said Gianna.

Figure 9. Parents and siblings stroll through the exhibits.

In an email a couple of days later the fifth grade teacher wrote, "I received so many compliments from the parents. They said they didn't think it would turn out as well as it did."

Implications

Among the most important insights of this exploration, is that using the environment as the "third teacher" enabled the fifth grade students to explore areas of interest; read and write for authentic and multiple purposes; demonstrate knowledge by applying their learning to real world situations; and use a variety of technical and informational resources to gather, synthesize, and communicate their understanding about improving the ecology to community and friends. Their experiences at the Preserve supported their abilities to analyze, hypothesize, and problem solve through hands on inquiry projects. They also fine-tuned their language arts skills by producing organized, interpretive, and persuasive reports with attention paid to facts, details, and the conventions of grammar and usage that would engage their audiences and effectively communicate their ideas. Families were eager to participate in the projects and assumed a variety of roles.

I would hope that students in more diverse communities are afforded the opportunity to explore this approach using local resources. Future "outdoor classrooms" must be conceptualized for the strength of this democratic nation and its economic viability will be determined by the forward thinking of this generation of students.

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[i] In keeping with the tradition of ethnographic and qualitative research, in which the researcher is present and contextualized within the writing, the first person "I" is used throughout. I am the author of this piece, an associate professor in the Literacy Program of the Department of Human Services and Counseling, at St. John's University, School of Education.

[ii] The term "outdoor classroom" was coined by the parish rector, who accompanied the children on several of their fieldtrips.

[iii] I met after school in October, March, April, and June with the cohort of teachers to reflect upon their goals and objectives, monitor student progress, clarify questions, and provide guidance. We discussed what was working, what was not, the points of tension, and additional resources needed.

[iv] Ms. Merilee Deperto, fifth grade teacher at St. Peter's of Alcantara and her students are depicted in this photographic essay. Originally there were twelve teachers who expressed interest in this initiative.

[v] New York State Standards for Language Arts and Science will be highlighted throughout this narrative in endnotes.

[vi] Robert Berens, a board member of Sands Point Preserve.

[vii] Four fieldtrips were taken in the fall and early winter, and three in the spring.

[viii] Teachers at St. Peter's used "United Streaming" to show video clips in the content areas.

[ix] Children identified as ADHD show improvement after play activities in natural settings, and that the "greener" a child play area (that is, the more it takes place outdoors), the less severe their symptoms (Taylor, Kuo, & Sullivan, 2001, Coping with ADD: The surprising connection to green-play settings, *Environment and Behavior,* 33 (1), 213-220.