

Third Grade Project Based Learning at Hoa ‘Aina O Makaha:

Impact on Department of Education Academic Measures

Project Report

by

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Report Summary:

The third grade project at the farm during school year 2010-2011 was definitely a success. Both students and teachers in all 4 classrooms enjoyed Wednesdays at the farm and had an opportunity to learn a great deal. For the one classroom where substantial “academic” gains on existing Department of Education academic measures in mathematics were also realized, an effort was made to identify the teaching strategies and organizational structures that lead to these successes. It is hoped that these instructional practices and organizational supports can be replicated in other classrooms where teachers and students have opportunities to take part in project-based, hands-on experiences in community settings like the farm at Hoa ‘Aina O Makaha

Project Description

In the spring of 2010, the initial idea was to bring the entire 3rd grade from Makaha Elementary to the farm at Hoa ‘Aina O Makaha every day. Teachers, in collaboration with farm staff, would conduct their lessons there rather than in their classrooms on campus. However, after several weeks of planning, it was decided that one full day at the farm, every Wednesday, would be a more realistic option. Starting then in the fall of school year 2010-11, 80 third graders with their teachers, came to the farm every Wednesday, all year long and rotated through four different activities, three in the morning and one in the afternoon.

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| <p><u>A TYPICAL DAY AT THE FARM</u></p> <ul style="list-style-type: none">• E ho mai Chant• Meeting at the Hale• Rotations: 3 before lunch & 1 after• Reflection Time |
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Goals for the project were:

1. To build a sense of community where students were encouraged to take care of themselves, others and the aina through demonstration of the Department of Education’s *General Learner Outcomes* (GLOs).
2. To enhance students’ academic achievement through project based learning at the farm that linked the students’ hands-on experiences there to learning in the classroom.

Each activity at the farm had a stated learning objective that was shared with the students; included a preset, debrief and reflection; integrated subjects areas; and linked farm activities to learning in the classroom.

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|--------------------------------------------------------|
| By the end of the lesson today, you will be better at: |
| It is important to learn this because.... |
| Think of the GLOs you will be using in today’s lesson. |

Activities were organized around project themes for example gardening, bees and culture. Projects ran for a number of weeks and helped give a uniform focus for the learning activities each Wednesday. An example of the alignment of classroom content areas in the gardening unit to the farm activities follows:

| <u>GARDENING</u> | | | | | | | |
|---------------------------------------|---------------------|--------------------------------------------------------------------------|---------------------|-----------------------------------------------------------------------|------------------------------------|---------------|----------------|
| SCIENCE | MATH | LANGUAGE ARTS | COOKING | MALAMA AINA | COMMUNITY BUILDING/ SELF-AWARENESS | MUSIC | ART |
| Interdependence of Plants and animals | Graphs and data | Narratives | Pizza | Raking/ Weeding | GLOs | Bean song | Symmetry |
| Scientific process | Measurement | Kauai pen pal | Tapioca Chips | Compost | Self-portraits | We Are Makaha | Self Portraits |
| Water cycle Terrariums | Multipli- cation | Italy hands | Kale Pasta | Organic Pesticide | | | |
| | | <u>Procedural writing</u> _How to plant _Recipes _Thinking maps | Green beans & bacon | <u>Planting</u> _Raised beds _Aqua-ponics _Container gardens | | | |

Impact on Academic Measures

At years end, teachers in general reported that the project had been a success. Students were demonstrating the GLOs...

- **Self-directed Learner** (The ability to be responsible for one's own learning)
- **Community Contributor** (The understanding that it is essential for human beings to work together)
- **Complex Thinker** (The ability to demonstrate critical thinking and problem solving)
- **Quality Producer** (The ability to recognize and produce quality performance and quality products)
- **Effective Communicator** (The ability to communicate effectively)
- **Effective and Ethical User of Technology** (The ability to use a variety of technologies effectively and ethically)

and academic growth, especially in writing, was evident. And as far as attendance was concerned, attendance on Wednesdays was always great!

However the concerns expressed from a “school” perspective, especially with the current *No Child Left Behind* proficiency expectations in reading and mathematics: Were the activities at the farm helping the students academically? An ongoing concern with hands-ons, project based learning in the community, has always been, sure the kids are learning things and having fun, but are these activities hurting them academically, as they take time away from classroom activities in core subjects like reading and math. To try to answer this question, two sets of school data were reviewed for the 3rd grade students at Makaha at the end of school year 2010-2011, student report cards and their Hawaii State Assessment scores in reading and math.

In reviewing the report card data, student’s scores in the academic areas of reading and math, GLO ratings, and attendance for grade 3 were compared to their scores a year early in grade 2. Although considered subjective by some, this data gives some insights into student progress from a teacher’s point of view. Overall, we found that teacher ratings on average in all three areas were basically the same for both grade 2 and grade 3. In looking at one of the four classrooms more closely, ratings in grade 3 for the GLOs were similar with slightly higher ratings on GLO #1 – *Self directed learner* and GLO # 5 – *Effective Communicator*. In the area of math and reading, scores again were basically the same, with slightly better grades in grade 3 for mathematics. And surprisingly for attendance, overall attendance was slightly lower in grade 3 when compared to grade 2, even though attendance on Wednesday as reported by the teachers was a strong point of the program.

So how did the students do on their Hawaii State Assessment scores in reading and mathematics? With one exception, the 3rd grade students’ scores were the same as their peers in the past from Makaha Elementary. Over the past 5 years, on average, approximately 40% of Makaha grade 3 students were considered proficient in both reading and math, which was approximately 25% lower than the statewide average last year. Last year’s grade 3 classrooms at Makaha averaged 40% in math and 35% in reading. When asked if this group of 3rd graders were average Makaha Elementary School students, teachers responded that they were but perhaps if anything, last year’s students offered a few more challenges academically. So what were the scores for the one exception... one classroom scored considerably higher than the Makaha average of 40% in mathematics with 67% of their students proficient in mathematics. How did this score for one classroom of 67% compare to other percentages statewide last year? It was slightly above the state average, met the NCLB objective for the year and was substantially higher than average scores for the Waianae/ Nanakuli Complex area schools for grade 3.

| SY 2010 – 2011 | Makaha Grade 3 | Waianae Complex | Complex Area | Statewide Grade 3 | NCLB Objective |
|----------------------------|-----------------------|------------------------|---------------------|--------------------------|-----------------------|
| Reading %Proficient | 35% | 49% | 44% | 67% | 72% |
| Math %Proficient | 40% | 44% | 43% | 65% | 64% |

Instructional Strategies and Organizational Supports

So what were the characteristics of the instructional practices and the organization of the project that lead to the successes in one classroom in mathematics?

To try to answer these questions: first the activities at the farm which focused on helping students in math that all classrooms took part in were reviewed; and then other aspects of the project and instructional strategies were considered that might have contributed to the higher scores in one classroom. The two teachers from the classroom scoring 67% proficiency in math provided the following information.

Examples of math activities that all classrooms took part in:

- Themed math constructed responses during kitchen cooking time, having to do with the crops harvested for that day. Word problems were based on real-life experiences (Hawaii Math Standards 3.2.4/3.3.2/3.2.1/3.2.2)
- Students had to create a growing pattern, based on preliminary data. For example, after planting papaya trees, they measured the trees and the time elapsed between measurements, then made predictions on growth patterns in the future (3.9.1/3.10.2)
- Singing multiplication songs during community building time in the hale (3.3.1)
- Students modeled situations involving multiplication and division of whole numbers using pictures and number sentences when planting seedling in trays - rows and columns (3.10.1)
- Students created pumpkin art by using flips, slides, turns, and symmetry. They had to read a procedural writing piece and follow the exact directions in order to complete the jack-o-lantern successfully (3.6.1/3.6.3)
- Book mark art – students chose a shape and decorated bookmarks for library use. One bookmark had all congruent shapes and the other bookmark had all similar shapes (3.5.2)
- Scavenger hunt – students were given clues, along with coordinates of the farm on a map, to find specific areas within the farm. Once at a certain destination, they were provided with another clue (3.8.1.)
- Students charted data based on plant growth, range in pitch of cuica instrument, and also voted on class name, and logo, and represented the results in different forms. (3.11.1/3.11.2/3.12.1)
- Students used measuring cups to compare and order fractions while cooking (3.1.3/3.1.4)
- Harvest was weighed before cooking to compare organic vegetables to the vegetables at local grocery stores (3.4.3/3.2.1/3.4.5)

Ideas on logistical and organizational aspects of their teaching experiences in this project that might have contributed to their scores:

- They were involved in planning since the initial meetings in the spring of 2010
- They were the only intact co-teaching team through the first semester

- They were “sold on the idea” from the very beginning and helped plan the project
- “The beginning of the year was front loaded with meetings, planning & preparation”
- “Our EA throughout the entire year was part of the program, showed up at planning meetings, took an active role in student learning, acted as a teacher in training, did more than what was asked of her, basically was a third teacher.”
- “We had more experience at Makaha elementary (6 years and 3 years) and had 3 years teaching together as a teaching team”
- “We had a special relationship with the farm, felt comfortable asking for resources and clearly had the same goals in mind for the project”
- “We were fortunate enough to have had experiences in the after-school program, known as PALS (Program for After-school Literacy Support), offered to 4th-6th grade students which emphasizes project-based learning. Conferences and professional development sessions that we were able to attend through PALS provided us with tools that could be utilized within the classroom setting. Also, having the time after school with the PALS students to experiment with different projects allowed us to critique and modify those plans to fit the content, standards, and needs of our 3rd graders, in order to use similar projects in our classrooms.”

Additional ideas on things they did in their classroom that they felt had an impact on their math scores that weren't part of the project but were embedded in their instructional practices.

- “Math talk” encouraging/expecting the use of rich math vocabulary while students shared their answers
- Incorporating the arts into math whenever possible
- Whole group discussions:
 - Preparing students for leaning on the farm
 - Reflecting on what was learned on the farm afterwards
 - Providing guiding questions for the activities
- Incorporating games, dances and songs that deliberately strengthened working memory

Conclusions

Based on the information provided by the teachers and a review of the students' “academic” records, the following conclusions are offered:

1. The activities at the farm did have considerable impact on the academic success of the students in one classroom in mathematics. However being on the farm wasn't the only reason the teachers in this classroom were successful with their students. It seems that the teachers being involved in the project from the beginning, and the “connections” that they felt and they were able to help their students make to the activities there, could be considered two of the keys to their success.

2. Hands-on activities outside the classroom can support academic achievement. In this case, where there were clear connections for both teachers and students to defined learning targets, the DOE math standards; and there were pre- and post-classroom activities connecting the experiences to the learning objectives, experiential activities outside the classroom clearly contributed to student learning.
3. The math scores improved and reading did not because there were clearer connection between the learning experiences on the farm and the math standards. Concepts and skills in math were more clearly connected to farm activities than were those necessary to impact reading comprehension.
4. This successful example can serve as a model in other settings where the instructional strategies, organizational structures, teacher characteristics and supportive circumstances can be replicated. .

In summary, we feel that the third grade project at the farm during school year 2010-2011 was definitely a success. Both students and teachers in all 4 classrooms enjoyed Wednesdays at the farm and had an opportunity to learn a great deal. For the one classroom where substantial “academic” gains on existing Department of Education academic measures in mathematics were also realized, an effort was made to identify the teaching strategies and organizational structures that lead to these successes. It is hoped that these instructional practices and organizational supports can be replicated in other classrooms where teachers and students have opportunities to take part in project-based, hands-on experiences in community settings like the farm at Hoa ‘Aina O Makaha.