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Bayview Elementary School
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Action Research Final Plan

1. My area of focus

Teaching science and social studies exclusively was new to me. Additionally this concept was new to our school. From the beginning of last school year I began my science classes with inquiry-based instruction. However, very early in the 2003 – 2004 school year I became frustrated with the result. The students were having a difficult time staying on task and completing their assigned projects productively. This group of students was unable to handle the freedom required to complete an inquiry-based lesson. I did not know if it was just the general make up of the population of students, or the way I was facilitating the Inquiry-based science lessons, or if I had started too early. I made a decision last school year that that this school year I would wait until late in the first semester or the beginning of the second semester before attempting an inquiry-based science curriculum.

Our school received a new principal this 2004 – 2005 school year. She has a very strong science background and was anxious for me to facilitate learning in the science classroom through inquiry-based instruction. She was very supportive and patient with me while I established my rituals and routines with my students in hopes of insuring my students were ready and able to handle the freedom of inquiry- based instruction. During the first semester of class I modeled numerous science investigations to give my students the advantage of seeing first hand how using the scientific process skills would look when they were actually involved in the inquiry-based science process. This also gave them an opportunity to see how science experiments are conducted to better understand scientific concepts and standards.

Joining the Action Research Project afforded me the opportunity to better analyze my practices with my students. I had two questions that I wanted answered. One, "Was there significant increase in learning using the inquiry-based strategies?" Two, "Are my students motivated more by learning science concepts using inquiry-based instruction versus traditional teaching practices?"

2. Literature review

- Elements in a Strategy for Teaching Science in the Elementary School by Paul E. Brandwein
- Team Science Organizing Classroom Experiments That Develop Skills by Marilyn Coffin
- Doing What Scientist Do by Doris Heinemann
- The Art of Classroom Inquiry by R. S. Hubbard and B. M. Power
- The Kid's Science Book - Creative Experiences for Hands-on Fun by Robert Hirschfeld and Nancy White

3. **Variables**
   All fifth grade regular education and main streamed students were involved in my study at Bayview Elementary School. I met with my students for seventy minutes each day. My strategies for teaching science were the traditional and inquiry-based. I separated each technique by semesters. First semester I taught mainly the traditional method. The second semester I facilitated learning through the inquiry-based method.

4. **My research questions that guided my research**
   a. Will growth in the area of science knowledge be evident at the end of second semester?
   b. Will there be growth in the area of application of the scientific process?
   c. Will there be a difference in the students' attitudes and motivation for gaining science knowledge?

5. **Approach that I studied**
   My first idea was to prove that inquiry-based instruction would improve science knowledge and growth in the area of application of scientific process. The definition for inquiry-based instruction is to facilitate learning in a way that would allow students the opportunity to experience science with a hands-on approach. My students would observe, using their senses to learn about objects and events. From their observations students would gather data and learn to make charts, tables, and graphs so that predictions and inferences can be made. The fifth graders that I teach would compare identify characteristics of things and events to find out how they are alike and different. Students would learn and implement the appropriate tools to measure mass, length, and volume. Eventually students would feel comfortable with the scientific process to make hypothesis based on their observations, knowledge and experiences in the science environment. Ultimately students will plan and conduct simple investigations by identifying and performing steps necessary to find answers to scientifically based questions using the appropriate tools. Students will have numerous hands-on experiences in exploring science so that they are comfortable using logical reasoning to explain events and draw conclusions based on observations. Teacher observation using rubrics will be used to determine students' successful completion of each concept covered. Some paper and pencil evaluations will be used to determine the success of the students' progress. This way of teaching was in contrast to the traditional style using a textbook the majority of the time to teach scientific knowledge. Using the traditional approach students read the material individually, in pairs, in small groups, or large groups. A discussion is led by the teacher about the content of what was read. Students copy an outline about the information read from the text and define vocabulary. A few demonstrations are done in the classroom to show examples of a concept covered in class. A paper and pencil test is administered after each chapter is read.
   Looking at the data displaying missed and correct items showed a significant increase of forty-six and six tenths percent science content knowledge improvement comparing the

first test administered to the last test administered. (Please see chart attached for a thorough break down of numbers.)

Secondly, I wanted to see if the students' motivation for learning science content would change using the inquiry-based method. The results were staggering in each category that I surveyed the students. (Please see attached survey form.) Eighty-two percent of my students said that they were motivated to learn the science material when able to complete hands-on investigations. Eighty percent of my students stated that they could see the relationship of the standard and the lesson when they completed hands-on investigations. Another eighty percent of my students said that they were excited to come to science class when they knew that they wee going to do hands-on investigations in class.

6. **Negotiations made**
   My principal was very supportive and open to the idea of this study.

7. **Timeline**
   a. Beginning in August, 2004, and up until the end of first semester I used the non-inquiry approach to teaching science. Most of the investigations were conducted using demonstrations by the teacher or students. Very little hands-on experiences were evident in my classroom during the first semester of this 2004 – 2005 school year.
   b. Beginning in January, 2005, I used an inquiry approach to teaching in science class.
   c. In September, December, February, and mid-April I administered the FCAT Practice Test to compare progress made by students.

8. **Data**
   a. I used two forms of the FCAT Practice Test. One form for the first two tests, and second form for the last two tests administered.
   b. I gave the students an attitude survey in mid April to evaluate their interests and styles of teaching preferred.
   c. All the data were summarized on charts and graphs.

9. **Data analysis and interpretations**
   Clearly the numbers show that growth in the area of science knowledge is evident at the end of second semester with forty-six percent of my students showing an increase in items marked correct on the FCAT Practice Tests. Another enlightening bit of information that I found useful was the improvement that the students made on two questions asked on the FCAT Practice Tests that required written responses. On the first test EVERY student missed each of the two questions (numbers eight and fourteen). On the last test administered on item eight, ninety-two percent of my students correctly answered the question, and for number fourteen, sixty-eight percent of my students answered the question correctly. This demonstrates to me that the more the students are actively involved in asking questions and solving problems in science they are better equipped to think like scientists; therefore, at ease with expressing themselves in a scientific manner.

   I was particularly impressed with the numbers that I calculated after completing the motivation survey. Eighty-two percent of my students replied that they were motivated to learn science information when completing hands-on investigations. Also eighty-two percent were motivated to learn more about the science standards through their experiences with hands-on investigations. Eighty percent of my students said that they were excited to come to science class when they knew that they would be completing hands-on investigations. (Hands-on investigation is the term I use with my students to communicate the inquiry-based science approach to learning science.)

10. **My next plan of action**
    Since I will be moving to Tampa my next plan of action will be to investigate the possibilities of working with the Pinellas County School District and the University of South Florida to further my endeavors with Action Research.

11. **Reaction to doing the Action Research**
    I have learned how much clearer the picture becomes displaying what a teacher is doing day to day through using the Action Research methods of analyzing data. After administering the attitude survey, I learned how truly motivated my students were to inquiry-based teachings. This project afforded me the opportunity to think and act "out of the box" as far as my typical teaching practices have been.

12. **MURMS Project**
    The MURMS project has helped me to improve my teaching practices because I have been given the tools to better understand how and why my students perform in the area of science. I have gained knowledge from the other members of this project gaining new insights into better teaching practices.