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Abstract: The purpose of my study was to investigate the student's academic achievement and attitude towards the marine environment before, during, and after the **FOR SEA** experience. In this program students investigated the nonliving and living factors that affect the marine environment. Students learned this content by "doing" science, using process skills to gather data, thus enabling them to generate their own concepts about the world (Kolb, 1988). The study examined constructs measured qualitatively and quantitatively in this case study, with student learning and attitudes being the focus of the study. The students experienced a 22 day unit regarding physical and biological aspects of the marine environment. Students' content knowledge concepts were measured with a pre- and posttest and "brain storming" maps. Students' marine-science attitudes were measured by the use of interviews, observations, documents (journals), "brain-storming" maps, and open-ended questionnaires.

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Case Study Of A Sixth Grade Class: Attitudes and Conceptions Of The Marine Environment

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PURPOSE OF THE STUDY

The purpose of my study was to investigate the student's academic achievement and attitude towards the marine environment before, during, and after the **FOR SEA** experience. In this program students investigated the nonliving and living factors that affect the marine environment. Students learned this content by "doing" science, using process skills to gather data, thus enabling them to generate their own concepts about the world (Kolb, 1988). The study examined constructs measured qualitatively and quantitatively in this case study, with student learning and attitudes being the focus of the study.

The students experienced a 22 day unit regarding physical and biological aspects of the marine environment. Students' content knowledge concepts were measured with a pre- and posttest and "brain storming" maps. Students' marine-science attitudes were measured by the use of interviews, observations, documents (journals), "brain-storming" maps, and open-ended questionnaires.

DESIGN AND PROCEDURES

I used the general interview guide approach by systematically interviewing 5 students (3 boys and 2 girls) to assess their attitudes about the marine environment before the **FOR SEA** unit began. I chose 5 students because I thought this would be a representative sample of the class. I chose the students with the help of the teacher on the basis of their first six weeks grade (high, average, and low), ethnic background and gender. I created an outline of questions to be covered during the interview with the students. Their answers generated common categories from which four questions were presented to the entire class in an open-ended questionnaire during the second class meeting.

The first class meeting was devoted to assessing students' content knowledge and attitudes about the marine environment. To assess understanding of concepts involving nonliving and living variables, I administered a paper and pencil pretest. This pretest covered all marine science concepts included in the study.

I conducted participant observations daily. The purpose of these observations was to witness firsthand the interactions taking place between student-student and student-teacher. Fieldnotes taken during each class and during other situations recorded the following observations: setting,

participants, activities and interactions (comments by teacher and students), frequency and duration of activities, subtle factors (nonverbal communication), unplanned events, and other information. In addition, as part of my fieldnotes, I recorded ideas, strategies, reflections, and patterns that emerged. These fieldnotes are a written account of what I saw, heard, experienced, and thought in the course of collecting and reflecting on the data during this study. I coded the data from my fieldnotes daily at school to develop emerging categories that helped contribute towards the grounded theory. This analysis in the field also contributed to theoretical sampling. Theoretical sampling (Strauss, 1987) was a means whereby I decided from my analysis of data what data would be collected next, from whom, and where.

I used two of the three basic approaches to collect qualitative data through open-ended interviews. They were conversational interviews and the general interview guide approach. The purpose of interviewing according to Patton (1980) "is to allow us to enter into the other person's perspective" (p. 196). I used the "emic" approach (Spindler, 1982) while conducting interviews and other data collecting methods in order to see and record the other person's perspective. I used conversational interviews frequently in combination with observations during the class period to help understand the students' reactions to the experience. I used conversational interviews with students in other settings during the day to help collect and elaborate on the data. I followed the general interview guide approach with students to assess their attitudes on the marine environment before and after the study.

During the study the students kept a diary (personal document) to record their thoughts about the **FOR SEA** daily discussion, activity or lab experience. Students were given time daily to write in their journal. Other personal documents used during this study were students' homework, drawings, and projects throughout the unit. I believed that the use of these personal documents were a reliable source of data concerning the students' attitudes, beliefs, and view of their world (Merriam, 1988).

At the conclusion of the unit, students' content knowledge and attitudes about the marine environment were assessed. To assess content knowledge, I administered a paper and pencil posttest, the same instrument as the pretest; it covered all marine science concepts taught in this unit.

To obtain the students' attitudes about the marine environment, I

administered an open-ended questionnaire. I also conducted interviews with the same 5 students, that were interviewed at the beginning of the study, to assess their attitudes after this experience.

CONCLUSIONS

Based on the results, I offer the following conclusions:

1. There is significant positive gain in students' knowledge and a better understanding of the marine environment as a result of **FOR SEA**. The students' posttest scores reflected an increase in knowledge of the marine concepts that were covered. The students' final "brain storming" maps indicated a better general understanding of the marine environment than their initial maps.
2. After experiencing **FOR SEA**, students were less likely to consider lakes, rivers, ponds, or swamps as concepts of the marine environment. These preconceptions were not included on the majority of the students' final "brain storming" maps.
3. Conceptual change did not occur over a period of 4 weeks as a direct result of **FOR SEA**. Sixty percent of the students' final "brain storming" maps had new concepts to described the marine environment such as "marshes" and "barrier islands."
4. The **FOR SEA** curriculum did have a positive impact on students' attitudes towards the marine environment. The students' last "brain storming" maps reflected some additional positive feelings that were not present on their first maps. They added words like "great," "important," and "exciting."
5. While they were taking this unit on marine science, the **FOR SEA** curriculum had an effect on the majority of the students' attitudes toward pollution in the marine environment. The students viewed a slide show, "We Care About Oceans," which informed them about the problem of pollution in our oceans and also enhanced prior direct experiences with pollution in the marine environment. Afterwards they consistently readdressed the issue in their journals, interviews, and their final "brain storming" maps.
6. During their study of the marine environment, the **FOR SEA** curriculum had an effect on some of the students' positive attitudes. Many students' took their prior direct experience (visits to the beach) and combined their indirect experience (**FOR SEA**) to help broaden and deepen their attitudes toward the marine environment.

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