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ENVIRONMENTAL EDUCATION: AN EXPERIMENTAL PROBLEM-FOCUSED APPROACH FOR HIGH SCHOOL STUDENTS

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ABSTRACT

High school students in the seventies have exhibited vivid and genuine concern for environmental issues. The judicious teacher attempting to channel this curiosity into truly comprehensive problem-focused learning experiences is many times inhibited when confronted with the organizational constraints of the typical school day. To overcome such restraints, the Kingsport City School System requested and received permission from the State Department of Education to offer an experimental community environmental problem-focused course for high school students during the summer of 1974. This four-week course was directed toward providing sufficient opportunities for secondary level students to conduct in-depth investigations of local environmental problems. Data and reports developed as a part of these research efforts were forwarded to appropriate agencies, businesses and governmental officials.

INTRODUCTION

The Kingsport City School System has been actively involved in environmental education since 1970. Initiated as primarily a nature study focused program for fourth, fifth, and sixth grade students, Kingsport's program has since expanded into a comprehensive environmental education approach spanning all grade levels. Utilizing an interdisciplinary approach, this program is activity-focused, involvement-oriented and centered around environmental problems and the wise use of natural resources.

Early in the development of the program, secondary students became involved in visits to community resource facilities and, more recently, have conducted microwatershed studies in the Upper East Tennessee Area. Nevertheless, these instructional strategies failed to bring about the desired degree of student involvement in actual work toward rational solutions to problems of the environment.

Accordingly, efforts were initiated to determine other

possible curricular approaches. A thorough review of the available literature, correspondence and interviews with other environmental educators, and discussions with teachers, administrators, students and representatives from the Soil Conservation Service and the Tennessee Valley Authority, all pointed in a similar direction—the need to develop a community problem-focused summer school program for secondary students.

METHODS

Course Development

In May, 1973, the Kingsport City School System contracted with the Tennessee Valley Authority to plan, develop, implement, and evaluate as a demonstration project in environmental education, the utilization of a mobile unit for conducting community-based environmental studies. Availability of the mobile unit and the included equipment for conducting environmental investigations allowed the flexibility and provided the instructional support materials instrumental in developing and conducting such an action-oriented program.

The new course, entitled Field and Human Ecology (FHE), was offered as an elective to eleventh and twelfth grade students during the first four weeks of the regular 1974 summer school session. Fifteen students participated in the initial experimental program. The single course prerequisite was the satisfactory completion of one unit of general high school biology. Successful completion of the summer course allowed the student a full science credit that could be utilized in fulfilling the requirements for graduation.

Normal summer school sessions run for six weeks, four hours a day. To provide the extra two hours per day necessary for extended community excursions, FHE classes met six hours a day, five days a week, for four weeks. The systemwide Environmental Education Coordinator served as program director throughout the four-week session.

The overriding purpose of the FHE course was to provide realistic opportunities for high school students to become actively involved in determining sources, investigating causes and suggesting alternative solutions to community environmental problems. Course objectives were fivefold:

1. To Develop an awareness of environmental problems and their potential solutions;
2. Become acquainted with methods and techniques for collecting and identifying relevant environmental data;
3. Understand the interrelatedness of the scientific, socio-economic, and political aspects of environmental problem solving;

4. Help participants become aware of possible careers in the environmental sciences; and, most importantly,
5. Become actually involved in working toward rational and objective solutions to local environmental problems.

By providing students opportunities to engage in learning activities leading to the fulfillment of these objectives, it was felt that the development of potentially environmentally literate citizens was greatly enhanced.

Schedule of Activities

The initial segment of the course was devoted to developing and refining the skills and techniques to be used by students in gathering and interpreting environmental data. Shortly thereafter, students formed study teams of twos and threes and selected specific community problems for further research. A list of possible research topics was provided, however, students were not required to select a project from this list. Several study teams did elect to investigate problems not suggested by this list. Examples of student research projects selected and conducted included: the detection and measurement of atmospheric pollutants in Kingsport and surrounding communities, a survey of excessive sources of noise, and an analysis of the role of local, state and federal agencies in providing and maintaining environmental quality.

A major portion of the course time was invested in the use of community resources. With Kingsport's Dobyns-Bennett High School serving as the home base, nearby industrial sites, rivers, lakes, areas of urban blight, and a paper recycling plant, among others, served as instructional support facilities throughout the course. Visits to these facilities were designed to provide students first-hand opportunities in making observations and collecting data relevant to local environmental problems, their probable causes, and potential solutions. Following these visits, each student study team reported findings and conclusions to the total group. Large group sessions were then used to promote further clarification and understanding of the data presented.

Although primarily field oriented, supporting classroom activities constituted a major course component. In addition to large and small group discussion sessions, in-class activities included reviewing and evaluating relevant films, filmstrips and other materials germane to the problems being investigated.

To provide a balanced view of the trade-offs and alternatives which must be considered when confronting many environmental problems, community resource personnel, including local industrial and business representatives, were invited into the classroom for discussions with students. Further clarification of opposing views on specific environmental problems was obtained by student arranged interviews with environmentalists, industrial leaders and city officials.

Students' Responsibilities

Students participating in the course had three major responsibilities:

1. An individual responsibility;
2. A small group study team responsibility; and
3. A responsibility to the group as a whole.

Individual responsibilities, as well as those of the study team and total group, were mutually determined by both the instructor and the students. The individual student assumed the following responsibilities:

1. To be responsible for reading pertinent books and articles, assigned and unassigned;
2. To work within the framework of the small group research team;
3. To provide research studies relative to a selected total group; and
4. To communicate study conclusions to the total group.

All students were required to maintain a notebook in which inquiries, data records, observations and notes, both assigned and personal, were maintained. This notebook was not a trite diary; rather it was a reflective log of ideas and experiences which will provide a data base for future programming efforts in this area. The coordinator periodically discussed and evaluated these notebooks with students.

Student research teams were responsible for scheduling resource personnel to address the total class concerning particular areas under investigation. Group input was also sought in selecting and planning visits to community resource facilities. Special emphasis was placed on each student being able to understand the major aspects of all research projects and each group member was encouraged to provide input for decisions in group meetings.

To obtain closure and aid in evaluating overall course impact, student teams were asked to submit a final project report. Each study team used the following format to conduct and report its community study:

1. Brief history of the problem under investigation. Information relating to local, state, regional, national, and international situations was used in this segment of the report.
2. Record of the data collected and the methods utilized.
3. Conclusions supported by the findings.
4. Recommendations for action.
5. Specific recommendations as to how the local problem can be solved.

Copies of these final reports were forwarded to the appropriate city officials, local industries, and the Environmental Protection Agency.

The assessment of students' progress was twofold, being conducted continuously throughout the course as well as at the program's completion. Four times during the duration of the course, each student conferred with the coordinator and discussed individual and group progress toward achieving the stated objectives of the course. Written interim and final examinations were administered that evaluated the participants' understanding of concepts encountered through outside readings, films, field activities, and discussions with visiting resource personnel. Additionally, each student study team's final report was evaluated using the format guidelines as the referencing criteria.

CONCLUSIONS

It is extremely difficult to objectively measure the impact of an environmental education program on human behavior. Consequently, this program had, and will continue to have, many values that will not be readily and directly observable. However, the program coordinator and others involved were able to assess mechanical and operational aspects of the course and to provide some insight into the actual program effect.

Students' responses to the course were positive and enthusiastic;

" . . . it's like a college class . . . more in-depth . . . meaningful . . . actual involvement . . . have testing equipment most places don't have."

The course coordinator observed that when students are responsible for initiating and designing their own research, they take a great deal of pride in their results. Many of the students made trips, outside of scheduled course time, to collect additional data related to their research project.

One note of caution is in order for educators con-