

Environmental Education Efforts in Ohio High Schools in the 1980s¹

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ABSTRACT. Educators in randomly selected high schools in Ohio were questioned to determine the treatment of environmental education in their curricula. Environmental efforts identified were examined for relationships with curriculum placement of the efforts, school size, type of school district, and location of district.

The study showed that many environmental concepts are included both as the primary subject matter of courses and secondarily in some courses. Considerable variation exists among schools regarding their treatment of environmental information in the curriculum. There were no relationships between any of the factors studied except for placement of environmental education within the curriculum.

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INTRODUCTION

The Environmental Education Act of 1970 (P.L. 91-516) encouraged states to initiate and develop programs to improve environmental quality and maintain ecological balance. Under this Act, a number of states received support for school programs in environmental education. While Ohio did not receive implementation funds under this act, the State Board of Education recommended on April 13, 1970:

that Ohio encourage elementary and secondary schools to take appropriate means to incorporate in the school curriculum a study of the interrelationships between all forms of life and the environment, with an emphasis upon the immediate necessity for reversing the present trend as well as repairing damage already done to the environment (State Board of Education of Ohio 1970).

In January of 1977, the Ohio Academy of Science established an Environmental Education Committee to develop implementation strategies for environmental education in Ohio. The Committee defined environmental education thus:

Environmental Education is a continuous process of learning which emphasizes interrelationships within and among systems.

- * **Process of learning** implies that many different ways of learning are equally valid as opposed to one learning process.
- * **Interrelationships** are emphasized, even though environmental education is also concerned with other facets of environment.
- * **Systems** is intended to mean *all* systems, including both human and natural components on a local, regional, state, world and/or universe level.

The Board of Education renewed its charge to the State of Ohio in 1980, recommending that the Ohio Department of Education "encourage the expansion of instruction and student experiences in environmental education," including the themes of energy, population, transportation, natural resource conservation, marine and aquatic education, environmental economics, environ-

mental quality, food production, ecology and similarly interrelated themes (Ohio Academy of Science 1977).

When new minimum standards for education were adopted in Ohio in December of 1982, the State Board of Education provided a list of topics to be covered in all new Courses of Study. Among the topics was "Energy and Resource Conservation Education." The scope of these concepts and suggestions for teaching them were the subject of a Minimum Standards Leadership Series guidebook in 1985.

While most Ohio educators can identify local efforts in environmental education and can also identify or even claim membership in one or more conservation education organizations, the extent of environmental education in Ohio high schools has not been documented. This study was designed to determine answers to the following:

- (1) What courses and/or topics are Ohio high schools offering in the 1980s to carry out state mandates for environmental education?
- (2) Are environmental education efforts in Ohio high schools related to school size, type of school district, or geographic region?

To avoid omission of schools that in 1982 called their programs something other than environmental education, a choice was made to use a very broad interpretation of environmental education, one which would encompass activities that could be more correctly called conservation education or outdoor education (McGowan & Kriebel 1975). For survey purposes, these were treated as a group of related but not necessarily equivalent nor inclusive concerns.

MATERIALS AND METHODS

SAMPLE SELECTION. Ohio is divided into ten Cooperative Extension Service Areas with approximately the same number of counties in each area (Fig. 1). One of the criteria used to develop the county groupings was to have within each service area a cross-section of the population. Thus, choice of sample schools from strata defined by these service areas would be likely to yield a representative sample for the state.

The high schools in each service area were identified by using the Ohio Educational Directory, and ten were randomly selected from each of the ten areas for a total of 100 schools. The sample consisted of 55 local county schools, 26 city schools and 5 exempted villages. The school types were represented in the sample in proportions roughly equivalent to their proportions among all of Ohio's 867 high schools in 1982. Nonpublic high schools were not selected, although these had an equal opportunity to be selected through the randomizing process.

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FIGURE 1. Cooperative Extension Areas in Ohio, with locations of sample schools.

INSTRUMENT DEVELOPMENT. A single-page, double-sided questionnaire was developed with the assistance of Dr. John Hug, Environmental Education Coordinator for the Ohio Department of Education. The survey consisted of:

- (1) a set of school descriptors;
- (2) blanks for listing names of courses having primary content in the areas of "environment, conservation education, or outdoor education concerns or topics," with subject area and grade level(s) of each;
- (3) a list of 21 environmental topics with blanks in which to write the percent of each course (from 2) devoted to the topics; and
- (4) blanks for listing other courses (in addition to those in 2) that include a "moderate treatment" of any of the environmental topics (from 3).

The instrument, along with a cover letter from Hug and Taylor, was addressed to each school's "Principal, Science Department Chairperson or Science Teacher." Responses were solicited during the winter of 1982-83 and updated in 1986.

RESULTS

Eighty-six percent of the surveys were returned. Demographics of the respondents indicated that 57% (49 of the 86 schools) were from rural areas, 27% (23 schools) were from cities with a population of 5,000 to 50,000, 15% (13 schools) were suburban schools and 1% (one school) was an inner city high school. There were about equal numbers of schools with fewer than 600 and more than 600 students. Sixteen schools reported a population exceeding 1,000 students.

Of the responses returned in 1982, 35% of schools offered at least one class with a primary focus on environment, conservation education or outdoor education. By 1986, this percentage dropped to 30% as eight high schools dropped such courses and four added them. Reasons for dropping the courses included enrollment decline, staff reduction, budget cuts, lack of textbooks in the field, and teachers not qualified to teach the material. The same schools that dropped the courses, how-

ever, indicated slightly increased numbers of 1986 courses that included environmental topics as *secondary* subject matter.

The courses identified in both years as focusing primarily on the environment were mostly science courses (76%, 63 courses), with the next largest group in vocational agriculture (2%, nine courses) (Table 1). For the most part, the courses thus identified were standard curricular offerings such as earth science and biology, which include a large amount of subject matter that can be classified as environmental simply because of its basis in things outdoors and their interrelationships. However, ten science course titles in this part of the survey appear to be for courses very specific to the environment. The definition of environmental education was

TABLE 1
Curricular headings and courses primarily dealing in environment or conservation education topics.

| SCIENCE | |
|-------------------------------------|-----------|
| Earth Science | 11 |
| Biology | 10 |
| Ecology | 6 |
| Environmental Science | 5 |
| General Science | 4 |
| Advanced Biology | 3 |
| Botany | 2 |
| Chemistry | 2 |
| Life Science | 2 |
| Animal and Plant Science | 1 |
| Environmental Concerns | 1 |
| Exploratory Science | 1 |
| Field Biology | 1 |
| Fish, Waterfowl and Furbearers | 1 |
| Forest and Farm Game | 1 |
| Horticulture | 1 |
| Independent Studies (Andros Island) | 1 |
| Local Plants and Animals | 1 |
| Management | 1 |
| Modern Science | 1 |
| Natural Resources | 1 |
| Nature Studies | 1 |
| Plant Science | 1 |
| Physical Science | 1 |
| Probing the Natural World | 1 |
| Science II | 1 |
| You and the Environment | 1 |
| TOTAL | 63 |
| SOCIAL STUDIES | |
| Civics | 2 |
| Social Problems | 1 |
| Sociology | 1 |
| World Geography | 1 |
| TOTAL | 5 |
| PHYSICAL EDUCATION/HEALTH | |
| Physical Education | 2 |
| Health | 1 |
| TOTAL | 3 |
| VOCATIONAL EDUCATION | |
| Vocational Agriculture | 9 |
| HOME ECONOMICS | |
| Home Economics | 2 |
| Housing | 1 |
| TOTAL | 3 |

not offered to survey participants, and none requested clarification.

A major portion of the survey was devoted to a determination of what topics were addressed in the environmental courses identified, and all topics were included to some extent in some courses (Table 2). However, small numbers of schools addressed topics such as estuaries, urban decay and "excess consumption of resources," and only three schools were teaching about architectural preservation in 1986. It appears that topics such as water pollution, energy, nature study and air pollution are being taught dependably in the high schools, but these appear in courses with widely varying titles.

In addition to the courses concerned primarily with the environment, some courses treat environmental topics as secondary subject matter, consuming less than 50% of course time, but nevertheless with integral content. Responding schools listed 277 such courses, an average of 3.2 courses per school. As in those courses with primarily environmental subject matter, courses with such secondary subjects were mostly science (199 courses or 72%), but the second largest category was social studies with 32 courses (12%).

No relationships were detected between number of environmental courses and school size, extension service area, or type of school district (local, city or exempted village). The average number of courses in each extension area is shown in Table 3.

DISCUSSION

Though relatively few courses can be identified bearing titles specifically relating to the environment, environmental education is apparently present in varying forms in Ohio high school science classes. Major topics in environmental education are being taught as the primary subject matter in courses in 30% of the high schools sampled, and all schools surveyed included at least some topics of this nature as secondary subject matter. The number of schools offering a given topic in

TABLE 2
Percentage of high schools addressing specific environmental education topics in 1983 versus 1986

| Topic | 1982 | 1986 |
|----------------------------------|------|------|
| Air pollution | 37.2 | 30.2 |
| Acid rain | 32.6 | 29.1 |
| Water pollution | 38.4 | 32.6 |
| Hazardous waste | 31.4 | 25.6 |
| Human population dynamics | 31.4 | 25.6 |
| Energy education | 34.9 | 31.4 |
| Mineral extraction | 29.1 | 19.8 |
| Endangered species | 31.4 | 27.4 |
| Aesthetic pollution | 20.9 | 16.4 |
| Urban decay | 18.6 | 12.8 |
| Architectural preservation | 10.5 | 3.5 |
| Estuary preservation | 20.9 | 14.0 |
| Escalating consumption | 24.4 | 17.4 |
| Land use management | 37.2 | 30.2 |
| Food production and distribution | 27.1 | 23.3 |
| Environmental quality | 32.6 | 25.6 |
| Environmental health issues | 31.4 | 25.6 |
| Soil erosion | 33.7 | 30.2 |
| Nature study | 32.6 | 29.1 |
| Noise pollution | 25.6 | 18.6 |
| Marine education | 29.1 | 25.6 |

TABLE 3
Average number of courses in each extension area.

| Extension Area | Average Number of Courses Offered | |
|------------------------|-----------------------------------|------|
| | 1982 | 1986 |
| Defiance | 4.2 | 4.33 |
| Eaton | 3.33 | 3.55 |
| Fremont | 4.0 | 4.0 |
| Wapakoneta | 3.85 | 4.0 |
| Washington Court House | 4.44 | 4.66 |
| Jackson | 4.0 | 4.0 |
| Belle Valley | 5.2 | 5.44 |
| Canfield | 3.44 | 3.44 |
| Wooster | 3.77 | 3.88 |
| Mt. Gilead | 4.5 | 4.75 |

environmental education has declined in all cases over the period of study.

Apparently it makes no difference whether the high schools are large or small, rural or suburban, in local districts, cities or exempted villages—environmental education (or conservation or outdoor education) is available in the schools.

Based on the apparent decline between 1982 and 1986 in the number of complete courses focusing on environment, such courses may be endangered by demographic and economic forces that have resulted in lower school populations, fewer faculty to offer courses and fewer dollars to support them. On the other hand, it may be that environmental educators are making greater use of the infusion process to insert environmental material in existing curricular areas rather than creating separate courses. A survey of state departments of education indicates that infusion is the preferred mode of instruction for environmental education nationally (Disinger 1987). Studies now in progress indicate that infusion of environmental subject matter occurs more frequently in social studies courses, perhaps implying that the "official" Federal Register definition of environmental education is now being interpreted in its comprehensive sense:

Environmental education is the process that fosters greater understanding of society's environmental problems and also the process of environmental problem-solving and decision-making. [It is] . . . not a single discipline, but rather is interdisciplinary and multidisciplinary. (January 30, 1974)

Since this survey was directed to science departments, respondents may have been unfamiliar with the range of activities in other curricula.

It can already be shown that Ohio students are deficient in basic information about some portions of the environment such as the oceans and Great Lakes (Fortner & Mayer 1983, 1988) and that oceanography is not widely taught in Ohio schools (Skinner and Martin 1985). The trend toward fewer environmental topics and courses should be curtailed if we are to continue progress to "improve the quality of the environment and maintain ecological balance" (P. L. 91-516).

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