THE IDENTIFICATION AND VALIDATION OF MINIMAL CRITERIA FOR THE PURPOSE OF DEVELOPING A CURRICULUM FOR AN ENVIRONMENTAL EDUCATION PROGRAM

By

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A DISSERTATION

Submitted to
Michigan State University
in partial fulfillment of the requirements
for the degree of

DOCTOR OF PHILOSOPHY

Department of Elementary and Special Education

1978

ABSTRACT

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Problem

The primary purpose of this research concerned the identification and validation of national minimal criteria for environmental education programs in order to:

1. Reduce much of the ambiguity presently associated with defining environmental education;
2. Establish minimal standards which can be used to determine if curricula purported to be environmental education are, in fact, environmental education;
3. Establish minimal guidelines for planning and implementing environmental education programs.

The specific objectives that guided this study included the following:

1. To identify, through a review of the literature, a list of tentative criteria for environmental education;
2. To determine if individuals with expertise in

environmental education perceived these criteria as valid;

3. To determine the extent to which directors of established environmental education programs perceive these criteria as being currently contained within their programs (Conditions As They Are);
4. To determine the extent to which directors of established environmental education programs believe these criteria should be contained within their programs (Conditions As They Should Be);
5. To determine if differences exist between what program directors perceive to be the real status of criteria in their programs (Conditions As They Are) and what they believe the ideal status of the criteria to be (Conditions As They Should Be).

Procedure

Following the validation of the criterion listing by a nationally select jury of fourteen individuals with expertise in environmental education, a questionnaire was mailed to directors of established environmental education programs. The questionnaire was designed to gather data concerning the real status of the criteria in environmental education programs as well as the ideal status of the criteria in these programs.

Summary

1. Directors of established environmental education programs reported slight evidence that the validated criteria are currently contained in their programs.

2. These directors reported greater support for current conditions containing environmental education criteria related to instructional strategies and desired learning outcomes than for criteria related to student participation and administrative factors outside the realm of the classroom.

3. Directors strongly believe that criteria related to instructional strategies, desired learning outcomes, and administrative factors outside the realm of the classroom should exist in ideal programs.

4. Program directors believe criteria related to student role and participation in ideal programs are more important for students at the Junior High and Senior High levels than for students at the Elementary level.

5. These directors believe that all criteria should be contained to a greater extent in their programs than they are at the present time.

Recommendations

The following recommendations, related to this study, are suggested for the improvement of environmental education.

1. The criteria are recommended to public or private school systems with established environmental education programs as a means by which present offerings can be evaluated.

2. In addition, the criteria can serve as a guide for individuals within a school system, or other institution, who wish to plan and implement an environmental education program where one does not presently exist.

3. While the establishment of these criteria are viewed as the initial step in bringing greater definition to environmental education, further research is needed to validate the feasibility of conditions suggested by these criteria within the framework of the school.

4. If we are to meet the challenge of solving future as well as present environmental concerns, then schools must assume a portion of the responsibility of producing an environmentally literate citizenry. To this end, present programs must be continued and expanded, and where programs do not presently exist, new ones must be established.

5. Education alone cannot be held responsible for producing environmentally literate citizens. Governmental agencies as well as community organizations must actively involve themselves in environmental education endeavors if this goal is to be achieved.

ACKNOWLEDGMENTS

There are many people whose support and encouragement helped contribute to the completion of this project. Among these are special individuals who deserve a special thanks and acknowledgment.

All members of my Doctoral Committee gave unselfishly of their time during all phases of this project. Dr. Glen Cooper and Dr. Gilbert Mouser provided much helpful guidance during the early phases of this research. Dr. Stanley Wronski willingly volunteered to fill a vacancy on the committee at a crucial time during the writing. Dr. William Walsh, chairman, has willingly tolerated innumerable demands on his time. His astute advice and wise counsel during this project were invaluable both personally and professionally.

Without the support of my colleagues at the McGuffey Laboratory School, Miami University, this dissertation may not have been completed. Dr. Mary Melvin, Ms. Barbara Urell, and Dr. Kay Trusty gave of their time so that I would have time to write. Dr. Jack Mason provided sound advice during all phases of this research. Dr. Drea Zigarmi, Director of the Lab School and adjunct member of the committee willingly endured countless demands on his

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time and provided invaluable counsel during those times when all seemed hopeless. His expertise and friendship contributed greatly to the completion of this project.

Gratitude is extended to Mr. Richard Quay of Miami University for his help during the early stages of the review of the literature and Dr. Joseph Simpson, Miami University, for his assistance in the analysis of the data.

And finally, words are inadequate for expressing the proper gratitude to those who have been closest during this project. A special thank you is extended to Mike Jacobson for his wisdom and support, but most of all his friendship. To my parents, James and Olive Pribble, thank you for your unswerving support and love which helped me to realize this dream. To my wife, Jaimie, thank you for caring enough to endure the many hardships of the past few years--especially all those hours in front of the typewriter. And to Jennifer, who was born during the writing of this dissertation, this belongs to you, too.

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CHAPTER I

STATEMENT OF THE PROBLEM

Introduction

During the 1960's, civilization began to develop an increased concern for the quality of the human environment. The publication of Rachel Carson's Silent Spring in 1962 is cited by some as the single most important factor in ushering in the Age of Ecology.[1] A myriad of books, articles, and films both informed Americans about the environmental crisis and warned of the dire consequences if solutions were not found quickly. Many saw the protection of endangered species and the preservation of existing wilderness areas as a solution. Others believed that if pollution could be eliminated from our air and water, the crisis would be over. But regarding such simplistic approaches to solving the environmental crisis, Lynton Caldwell states:

> There could be no greater misconception of its (environmental crisis) meaning than to believe it to be concerned only with endangered wildlife, man-made ulginess, and pollution. These are part of it, but more importantly, the crisis is concerned with the kind of creature that man is and what we must become in order to survive.[2]

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[1] G. Tyler Miller, Jr., Living in the Environment: Concepts, Problems, and Alternatives (Belmont, Calif.: Wadsworth Publishing Co., 1975), Forward.

[2] Ibid.

It would seem, then, that the solutions to the environmental crisis are not external at all, but rather internal, finding their source in those aspects of our life style we value most. Upgrading the quality of the human environment requires more than changing a few bad habits.

In Living in the Environment, G. Tyler Miller states that men and women can no longer afford a "frontiermanship" philosophy with its greatly increased control over nature and increasing number of undesirable effects on the environment. Man vs. nature must be replaced by man and nature, where an earthmanship philosophy allows selective control of the natural environment based on ecological understanding and cooperation.[3] In regard to the human environment, Harvard ecologist Fred E. Smith states:

> The human environment is an immense complex of natural elements, man-made structures, institutions, societies, and other people. Environmental welfare and human quality are not two independent evaluations. They are two views of the same system of interactions. It is not possible for one to remain good while the other is bad.[4]

If we accept the views of Miller and Smith, then environmental quality can be achieved only if all members of society are reoriented in their attitudes toward their natural and man-made surrounding.

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[3]Ibid., p. 29.

[4]William E. Brown, Environmental Education Manual for New Mexico Teachers, U.S. Educational Resources Information Center, ERIC Document ED 116 947, November, 1970, p. 8.

Background of the Problem

In recent years, the environmental crisis has become the concern of professional educators. Experts from universities, public school systems, governmental agencies, and society at large are calling for schools to design and implement environmental education programs. But those who would design curriculum for such programs are hindered by a number of obstacles.

1) At the present time there is no definition of environmental education that is accepted on a nationwide basis.

2) National criteria do not exist for the purpose of determining whether or not curricula purported to be environmental education is, in fact, environmental education.

3) Minimal criteria, for the purpose of establishing an environmental education program do not exist.

It is believed that environmental education cannot be effectively planned or implemented until such criteria are identified.

In regard to planning environmental education curriculum, Kelly and White cite four conditions that contribute to the ambiguity of many efforts:

1) Environmental education lacks the tradition of other discipline areas.

2) Only limited assistance can be found in the professional literature.

3) Teacher education institutions do not include environmental education as part of their teacher preparation programs.

4) There is an absence of school wide and cross grade planning.[5]

In addition, the failure to adequately define the parameters of environmental education has contributed to an ambiguity that restricts effective curriculum planning. In a review of environmental education for school administrators, Hegelson states:

> The reluctance of persons concerned with environmental problems and environmental education to define the area of their concerns has led to a diffuseness in the discussion which is unlikely to lead to useful analysis of the problems or to the successful resolution of them.[6]

Critics of environmental education also point to its seeming lack of direction and failure to deal with those key issues at the heart of the environmental crisis, as contributing to superficial and academically shallow programs. In addition, some find the environmental revolution to be one of oversimplification and chaos where activities are carried out in conceptual isolation and suffer from a thinly disguised dichotomy that forces a choice between man and

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[5]J. R. Kelly and E. P. White, "Developing Framework for Planning Environmental Education Programs," Science and Children 12 (April 1975):14.

[6]Stanley L. Hegelson, et. al., Final Report OEG-0-71-2732: A Review of Environmental Education for School Administrators (Columbus, Ohio: U.S. Department of Health, Education and Welfare, National Center for Educational Research and Development, 1971), p. 4, cited by Arthur Maurice Lucas, "Environment and Environmental Education: Conceptual Issues and Curriculum Implications" (unpublished doctoral dissertation, The Ohio State University, 1972), p. 13.

nature.[7]

Statement of the Problem

In an attempt to eliminate much of the ambiguity presently associated with environmental education, this study is concerned with the identification and validation of criteria for environmental education programs. In addition, it attempts to determine not only if such criteria are perceived by directors of established environmental education programs as being contained in their present offerings, but if these same criteria should be contained in ideal programs. If environmental education program directors perceive that these criteria are not only desirable, but also feasible, then it is believed that the criteria can be recommended for the purpose of:

1) Arriving at a tentative working definition of environmental education.

2) Determining whether or not curricula purported to be environmental education are, in fact, environmental education.

3) Establishing minimal guidelines for planning and implementing environmental education programs.

Many professional educators and environmentalists perceive environmental education as educating for the future. It is society, not scientists that must take the

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[7]R. M. Agne and R. J. Nash, "Environmental Education: A Fraudulent Revolution?" Teacher's College Record 76 (December 1974):304-306.

responsibility for solving our environmental problems.[8] If this is to occur, environmental education programs must be designed which will produce environmentally literate citizens. But if schools are to achieve this goal, there is a need to establish criteria for minimum curriculum on a national basis.

Specific Objectives

In order to identify minimal criteria for environmental education programs, the objectives of this study were stated as follows:

1) To identify, through a review of the literature, a list of tentative criteria for environmental education.

2) To determine if individuals with expertise in environmental education perceive this criterion listing as valid.

3) To determine the extent to which directors of established environmental education programs perceive these criteria as being currently contained within their programs.

4) To determine the extent to which directors of established environmental education programs believe these criteria should be contained within their programs.

5) To determine if differences exist between what program directors perceive to be the real status of the criteria in their programs and what they believe the ideal status of the criteria to be.

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[8]Barry Commoner, "Science and Social Action," Science Teacher 39 (May 1972):18.

Definition of Terms

Environmental Education

Much of the ambiguity associated with environmental education results from a lack of definition. At the present time, there appears to be as many definitions for the concept as there are programs. Ultimately, it is believed that the identification and validation of environmental education criteria will lay the foundation for a more widely accepted working definition. But for purposes of this study, environmental education will be defined according to the two working definitions published by the United States Office of Education.

Working Definition #1

> 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. This is accomplished by teaching the ecological relationships and principles that underlie these problems and showing the nature of possible alternative approaches and solutions. That is, the process of environmental education helps the learner perceive and understand environmental principles and problems and enables him to identify and evaluate possible alternative solutions to these problems and assess their benefits and risks. It involves the development of skills and insights needed to understand the structure, requirements and impact of interactions within and among various environmental entities, subsystems, and systems.[9]

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[9]Richard Rocchio and Eve Lee, Planning for Environmental Education: The Nation's Experience, 1970-1973, U.S. Educational Resources Information Center, ERIC Document ED 096 156, December, 1973, pp. 15-16.

Working Definition #2

> The term environmental education means the educational process dealing with man's relationship with his natural and man-made surroundings and includes the relation of population, pollution, resource allocation and depletion, conservation, transportation, technology, and urban and rural planning to the total human environment. That is, environmental education is the process of inquiry into both the specific and general implications of human activities viewed from the perspective of social needs and values as they relate to general public policy.[10]

While the literature reveals a myriad of definitions for environmental education, the two mentioned above were used by a majority of authors and would appear to include many of the elements common to all definitions. A more extensive discussion of environmental education definitions is presented in Chapter II.

Interdisciplinary Curriculum

Within the parameters of this study, interdisciplinary is defined as a "term applied to courses of study which merge for purposes of expediency, two or more bodies of knowledge."[11] No attempt is made here to distinguish between interdisciplinary, trans-disciplinary, and multidisciplinary frameworks. An interdisciplinary framework for environmental education, then, is one which incorporates concepts and generalizations from many disciplines for the purpose of

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[10] Ibid., p. 16.

[11] D. H. Ost, "Changing Curriculum Patterns in Science, Math, and Social Studies," School Science and Mathematics 75: 48-49.

achieving those stated goals and objectives of an environmental education program.

Integrated Curriculum

Subject matter that is integrated into the existing curriculum does not result in additional courses for students. The stated goals and objectives become a component of those courses that currently comprise the curriculum. As a result, students acquire knowledge and develop skills relevant to the "new" subject matter as a part of their ongoing participation in the existing curriculum.

Environmental Education Criterion

An environmental education criterion, as it relates to this study, is a standard against which an environmental education program can be compared. It indicates an ideal condition for such a program. It is assumed in this research that programs which reflect the environmental education criteria to a greater degree come closer to approaching the ideal than those which reflect it to a lesser degree.

Man-Made Environment

The man-made environment refers to those elements of the environment that exist as a direct result of human influence. More specifically, the term refers to those structures and conditions that exist because of man's attempt to alter and order the natural environment to accommodate his life

style. Examples range from urban population centers to agricultural areas.

Natural Environment

While the man-made environment exists as a direct result of human influence, elements of the natural environment exist independent of human influence. This is not to say that the impact of humans cannot be observed in the natural environment. It would be next to impossible to isolate a segment of the environment that does not show the effect of human presence.

Directed Outdoor Learning Experience

A directed outdoor learning experience is an instructional strategy in the outdoors, designed to achieve a specific purpose. It may or may not be under the direct supervision of a teacher. A non-directed experience is designed for the purpose of allowing students to get what they want out of the experience. A student participating in a directed experience is being guided toward the achievement of a specific learning outcome.

Staffed Environmental Education Center

An environmental education center with full time staffing is one that exists independent of a specific school district and is different from an environmental education clearing house which has only incidental staff support. The

function of such a center includes the following:

1) to provide students, teachers and administrators in surrounding school districts with information concerning the environment;

2) to provide teachers and administrators in surrounding school districts with inservice opportunities relevant to environmental education; and

3) to provide students in surrounding school districts with opportunities to learn in their environment.

While it is recognized that such a staffed center could provide additional services, those mentioned above are perceived as germane to this research.

Inquiry, Problem Solving and Process Skills

For the purposes of this study, the above terms are defined according to their relationship with each other. Inquiry is defined as:

> . . . the activity of working with data and making statements from data. Through the activities of inquiry, investigators--whether they identify with the social, natural, physical, or mathematical sciences--generate knowledge.[12]

Problem solving is seen as the motivation for inquiry. Students generate knowledge for the purpose of arriving at a solution or alternative solutions, to a problem. Process skills are those skills necessary to actively inquire into

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[12]Frank L. Ryan and Arthur K. Ellis, Instructional Implications of Inquiry (Englewood Cliffs, N.J.: Prentice Hall, Inc., 1974), p. vii.

a problem. They include: stating the problem; hypothesizing; gathering data; processing data; making inferences from data; and generating solutions to the problem, based on the data.

Assumptions and Limitations

1) It was assumed that a review of relevant literature in environmental education would reveal a tentative criterion listing for environmental education programs. While such a listing did emerge, it may not be complete. Other sources, unknown and not utilized by the author, may reveal additional and equally valid criteria.

2) It was assumed that the opinions of the jury regarding validation of the criterion listing were representative of all experts in the field. While an attempt was made to insure expertise and attain a national representation, it was a physical impossibility to draw a random sample of everyone with expertise in environmental education.

3) Data gathered with the questionnaire are based on the perceptions of environmental education program personnel. While it can be assumed that program personnel act and make curricular decisions according to their perceptions, it can not be assumed that these perceptions are necessarily an accurate reflection of reality.

4) The use of questionnaires in survey research brings the additional limitations of possible low return

rate and ambiguity regarding interpretation of specific items on the survey instrument. While the effect of ambiguity can be minimized through review and piloting of the instrument, it is recognized that it cannot be eliminated altogether.

Plan of the Study

The design and results of this study are reported in five chapters. Chapter I includes the statement of the problem, specific objectives of this research, specially defined terms related to the study, and assumptions and limitations inherent in the research design. Chapter II is a review of related literature in environmental education. It is from this review that the environmental education criterion listing was constructed. Chapter III reveals the design of the study and explains the methods and materials of data collection. Additionally, hypotheses are examined, the population is described, and statistical procedures for analysis of the data are indicated. Chapter IV presents a detailed analysis of the data and Chapter V includes the summary, conclusions, implications, and recommendations.

CHAPTER II

REVIEW OF RELATED LITERATURE

The review of the literature was conducted for the purpóse of determining if professional literature related to environmental education would reveal tentative, minimal criteria for environmental education programs. If the literature suggested such a criterion listing, it could serve as a focal point for bringing greater definition to the field as well as providing minimal guidelines for program development. The review of the literature was conducted to encompass the historical aspects of environmental education as revealed through early science education literature as well as current curricular efforts in the field. It was believed that such a review would reveal criteria related to current definitions of environmental education, goals of established programs, and curriculum development efforts in the field.

History

Historically, environmental education can be traced to the mid-nineteenth century. During this time, teaching was associated with the educational theories of Johann Heinrich Pestalozzi, who sought through object teaching to maximize real experiences for children. The methodology had

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a strict formal structure which directed the child to observe and classify objects and organisms in the environment, while learning the associated vocabulary. The influence of mental discipline and faculty psychology led educators to believe that much could be gained from memorizing facts.[1] Herbert Smith states:

> The emphasis on observation and memorization for very young children was based on the assumption of the sequential development of capacities. It was falsely assumed that young children were able only to observe and identify objects but were unable to reason or to interpret phenomena.[2]

Moral and religious goals were also prominent in object teaching. Science was viewed as a means to strengthen a child's morals, although detractors of object teaching pointed to its lack of order and direction.[3] Object teaching in both the United States and England evolved into, and eventually was replaced by, Nature Study.[4]

Nature Study began to receive widespread attention at the turn of the century, as evidenced by its philosophy set forth by Wilbur S. Jackman in the third yearbook of the

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[1]Paul DeHart Hurd, and James J. Gallagher, New Directions in Elementary Science Teaching (Belmont, Calif.: Wadsworth Publishing Co., 1969), pp. 21-22.

[2]Herbert A. Smith, "Historical Background of Elementary Science," Readings in Science Education for the Elementary School, ed. Edward Victor and Marjorie S. Lerner (New York: Macmillan Publishing Co., 1975), p. 4.

[3]Hurd, pp. 21-22.

[4]Smith, p. 3.

National Society for the Study of Education.

> The spirit of nature study requires that the pupils be intelligently directed in the study of their immediate environment in its relation to themselves; that there shall be, under the natural stimulus of the desire to know, a constant effort at a rational interpretation of the common things observed. If this plan be consistently pursued, it will naturally follow that the real knowledge acquired, the trustworthy methods developed and the correct habits of observing and imaging formed, will lay a sound foundation for the expansive scientific study which gradually creates a world picture, and at the same time enables the student, by means of the microscope, the dissecting knife and the alembic to penetrate intelligently into its minute details.[5]

The Nature Study movement grew as a reaction to urbanization and was intended, in part, to make individuals sympathetic with nature so they could enjoy the rural life. The inculcation of aesthetic values and a moral commitment to nature was fundamental to the Nature Study movement.[6] Advocates of Nature Study assumed that: ". . . immediate and casual interests of children should be the leading factor in the selection of what is to be studied."[7] Kuslan and Stone list the following goals of Nature Study as it was taught during the early years of the twentieth century.

1) To help children become familiar with things about

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[5]Wilbur S. Jackman, Nature Study Third Yearbook of the National Society for the Study of Education, Part II (Chicago: University of Chicago Press, 1904), p. 9.

[6]Richard Alpha Brice, III, "A Procedural Model For Developing Environmental Education Programs for Teachers of Young Children" (unpublished doctoral dissertation, University of Georgia, 1973), pp. 14-15.

[7]Ibid., p. 16.

them; to appreciate them for their value; to love them for their beauty.

2) To bring children to a living sympathy with everything that is.

3) To give things their true ethical value.

4) To keep alive the office and use of poetry; particularly the poem called verse.

5) To appreciate nature descriptions in literature.

6) To make his surroundings more attractive to the country child on the farm.

7) To give appreciation of the practical value of living phenomena.

8) To cause the child to appreciate, for no other reason aside from loving them (plants and animals).[8]

Liberty Hyde Bailey and others at Cornell University were major forces behind the Nature Study movement. The Handbook of Nature Study by Anna Botsford Comstock, along with the Cornell Rural School Leaflets were available to schools through the early sixties. These publications, as well as others by this group from Cornell, are credited as being "among the most comprehensive efforts in teacher education ever undertaken in the field of science education."[9]

Critics of the Nature Study movement pointed to its lack of organization, anthropomorphic interpretation of, and

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[8]Louis I. Kuslan and A. Harris Stone, Teaching Children Science: An Inquiry Approach (Belmont, Calif.: Wadsworth Publishing Company, 1968), p. 113 cited by Wesley Max Walser, "Environmental Education Kindergarten Through Grade Twelve: A Resource Guide for Teachers" (unpublished doctoral dissertation, Duke University, 1973), p. 30.

[9]Smith, p. 6.

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its extravagant claims for aesthetic and emotional values.[10] In addition, Nature Study, like object teaching, viewed the child in terms of his limitations rather than his capabilities.[11]

Prior to 1900, the general consensus seemed to be for a one-year biological experience for high school students with emphasis on the broad principles of the discipline.[12] During meetings for the formulation of educational objectives in 1893, the National Education Association's Committee on Secondary School Studies concluded: ". . . at least one fourth of high school should be devoted to nature studies, and this should be a requirement for entrance to college."[13]

By 1909, beginning biology courses were again undergoing change. Linville reported that a group of New York teachers were emphasizing the more practical aspects of biology. These included an economic phase stressing the preservation of natural resources; a health phase dealing with the relationship between food, work, medicine, disease, and proper health habits; a cultural phase showing the interrelationship of man and other beings; and a disciplinary

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[10]Brice, p. 15.

[11]Smith, p. 6.

[12]Paul DeHart Hurd, Biological Education in American Secondary Schools 1890-1960 (Washington: American Institute of Biological Science, 1961), p. 14.

[13]Ibid., p. 13.

phase emphasizing the application of the disciplines to problems of daily life.[14]

In 1916, the Committee on Natural Sciences of the National Education Association revised and restated an earlier set of objectives in biology curriculum. They concluded that biology should:

1) Arouse interest in nature by giving first hand acquaintance with the environment;

2) Emphasize some of the most important applications of science to human welfare;

3) Give pupils training in careful observation, in forming logical conclusions, in solving problems, and carrying out projects;

4) Make real to the pupils the value of intensive study of any given science as a means through which scientific progress is gained.[15]

Many of the concerns of environmental education in the seventies were reflected by science educators of the twenties. The Commission on the Reorganization of Secondary Education (1920) established a special committee headed by Otis W. Caldwell whose purpose was to examine the science curriculum. The committee concluded that biology courses should contain the central ideas of:

a) maintenance of organisms and life of the species;

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[14]H. R. Linville, et. al., "The Practical Use of Biology," School Science and Math 9 (February 1909):121-129.

[15]James E. Peabody, et. al., "Revised Report on the Biology Committee of the National Education Association Commission on the Reorganization of Secondary Education," School Science and Math 16 (June 1916):502-503.

b) the interrelationship between varying organisms and groups of organisms;

c) dependence and interrelations of living things with the physical world; and

d) man's control of plants and animals to serve his own ends.[16]

In 1923, George W. Hunter prepared a biology curriculum after soliciting the interests of 2,500 first year High School students. It contained nine teaching units, three of which reflected environment concerns: 1) Living things in relation to the environment; 2) The interdependence of living things; and 3) Man's control of his environment.[17]

By the late thirties, the objectives of education seemed to be changing again. In 1938, the Progressive Education Association prepared a document designed ". . . to orient science teaching to the broad areas of living characterized as: 1) personal living, 2) immediate personal relationships, 3) social civic relationships, and 4) economic relationships."[18] The National Society for the Study of Education devoted its

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[16]Otis W. Caldwell, chairman, Reorganization of Science in Secondary Schools, Commission on Reorganization of Secondary Education Bulletin, 1920 #26 (Washington: Department of Interior, Bureau of Education, 1920), cited by Hurd, Biological Education, pp. 35-38.

[17]George W. Hunter, "Report of the Committee on a One Year Fundamental Course of Biological Science," School Science and Math 23 (October 1923):657-659.

[18]Nelson B. Henry, ed., "The Objectives of Science Instruction," Science Education in American Schools, Forty Sixth Yearbook of the National Society for the Study of Education, Part I (Chicago: University of Chicago Press, 1947), p. 22.

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forty sixth yearbook to the problems of science education and it shows a marked concern for some of the affective objectives of science education.[19]

> Situations and experiences should be so ordered that the following facts become a part of the framework of the children's social outlook. Man, as well as other organisms is dependent upon his environment for adequate living. All life, including man is interdependent. Change is a fundamental characteristic of the environment to which man, as well as other organisms must be able to adjust in order to survive and to live comfortably. The interaction of physical forces and living things, including man, maintains constant conditions of change in the framework of living. The individual organism or group, which does not have the capacity to adjust successfully to continually changing demands is doomed to extinction. The best adapted are most successful in the game of life. It should follow that man being a rational creature, should, through his knowledge of natural processes, intelligently use the environment for his survival and ultimate welfare.[20]

The conservation movement of the late twenties and early thirties was also a forerunner of environmental education. The term conservation was first used by Theodore Roosevelt and his chief forester, Gifford Pinchot, to describe their policy of "the wise use of all our natural resources resulting in the greatest good for the greatest number of people."[21] Conservation education appears to have received its greatest emphasis during and immediately

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[19]Smith, pp. 8-9.

[20]Henry, "Organization of the Curriculum in Science," p. 88.

[21]R. M. Bruker, "Historical Approach to Environmental Education," Clearing House 48 (November 1973):135-136.

following the dust bowl period of the thirties.[22]

In 1954, the National Association of Biology Teachers appointed a task force to set up objectives and to develop methods and materials for conservation education. The result was a handbook for teachers.

> Conservation is gradually becoming a way of life. More and more people are coming to accept the concepts of conservation and to govern their lives thereby. And yet, the number of our people who remain relatively unaffected by these concepts is distressingly large. How to help reduce this indifference to the wise use of our natural resources is the purpose of this handbook.[23]

But in spite of the lofty purpose set forth in the handbook, conservation education was usually relegated to one chapter in a biology or general science textbook.[24]

Definition of Environmental Education

In 1970, the Environmental Education Act was signed into law. The purpose of this act was to encourage and support individual states in initiating and developing environmental education programs with the purpose of improving the quality of the environment and maintaining an

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[22]John Younger Jackson, "An Environmental Education Plan for Montana" (unpublished doctoral dissertation, University of Montana, 1974), p. 9.

[23]Richard L. Weaver, Handbook for the Teaching of Conservation and Resource Use (Danville, Ill.: The Interstate Printers and Publishers, 1958), p. 18.

[24]Marshall T. Wiebe, "What's in a Name?" Maine Fish and Game 1 (Winter 1970-1971):16-17, cited by Douglas L. Schaefer, "The States and Environmental Education" (unpublished doctoral dissertation, Northwestern, 1972), p. 15.

ecological balance.[25] Suggested activities included:

1) The development and dissemination of new and improved curricula through model education programs.

2) Provisions for supporting the initiation and maintenance of programs in environmental education at the primary and secondary school levels.

3) Provisions for pre-service and inservice training for teachers and non-educational personnel such as community leaders and government employees.

4) Provisions for supporting outdoor ecology study centers, community education programs, and the preparation and distribution of materials by the mass media.

5) Comprehensive statewide program development.[26]

As of December, 1973, twenty eight states, Washington, D.C., and the Tennessee Valley Authority were engaged in comprehensive, state wide environmental education planning.[27] The Office of Environmental Education suggested the following guidelines for preparing grant proposals regarding statewide planning of environmental education programs.

1) A state plan should be dynamic and flexible enough to respond continuously to the needs of the people in the state.

2) It should document and make use of the existing and potential resources in the state including curriculum materials, facilities, funds, personnel, and information concerning the environment.

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[25]Richard Rocchio and Eve Lee, Planning for Environmental Education: The Nation's Experience, 1970-1973, U.S. Educational Resources Center, ERIC Document ED 906 156, December, 1973, p. 3.

[26]Ibid., p. 3.

[27]Ibid., p. 8.

3) It should be an overall educational plan utilizing both formal and non-formal educational systems.

4) It should describe needs and priorities in implementing the plan.

5) It should be useful to a variety of agencies and organizations in identifying their best means of providing assistance.

6) The planning group should involve a task force composed of representatives of statewide constituencies in elementary and secondary education, higher education, conservation, health and environmental protection agencies, private educational and environmental organizations, broadcasting, business, labor and industry and should therein reflect the educational and environmental resources of the state.[28]

The United States Office of Education published two working definitions of environmental education in its 1973-1974 guidelines for proposal writing. The first definition emphasizes process and theory while the second definition has its emphasis on content and purpose.[29]

Working Definition #1

> 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. This is accomplished by teaching the ecological relationships and principles that underlie these problems and showing the nature of possible alternative approaches and solutions. That is, the process of environmental education helps the learner perceive and understand environmental principles and problems and enables him to identify and evaluate the possible alternative solutions to these problems and assess their

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[28]Richard Rocchio and Eve Lee, On Being a Master Planner - A Step by Step Guide, U.S. Educational Resources Information Center, ERIC Document ED 108 866, December, 1974, p. 3.

[29]Rocchio and Lee, Planning for Environmental Education, pp. 15-16.

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> benefits and risks. It involves the development of skills and insights needed to understand the structure, requirements, and impact of interactions within and among various environmental entities, subsystems, and systems.[30]

Working Definition #2

> The term environmental education means the educational process dealing with man's relationship with his natural and man made surroundings and includes the relation of population, pollution, resource allocation and depletion, conservation, transportation, technology, and urban and rural planning to the total human environment. That is, environmental education is the process of inquiry into both the specific and general environmental implications of human activities viewed from the perspective of social needs and values as they relate to general public policy.[31]

While the wording of environmental education definitions may vary from state to state, they all tend to reflect the basic elements contained in these two definitions.

James E. Allen Jr. states that the specific tasks assigned to environmental education can be summed up briefly as awareness of how we and our technology affect, and are affected by our environment; concern for man's new and unique responsibility to re-establish and create beneficially balanced relationships among all forms of life within the closed earth system; and motivation and training to enable us to acquire and spread the knowledge and skills that will help us solve interrelated environmental problems and prevent

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[30]Rocchio and Lee, Planning for Environmental Education, pp. 15-16.

[31]Ibid., p. 16.

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their future occurrence.[32]

The State Master Plan for Environmental Education Programs in North Carolina considers the following elements essential in defining environmental education.

1) It is a process. That is, it is a cumulative activity, with each new level of schooling adding sophistication in skills and depth of understanding. The specific nature of courses and emphasis will change with a continued cycle of planning, implementation, evaluation, and revision.

2) Environmental education is a participative activity at every stage. Planning, implementation, evaluation, and revision must be cooperative with both instructors and students participating at each step.

3) Environmental education is interdisciplinary and requires a total systems approach. It must be integrated into the present curriculum rather than being made a separate course of study.

4) The major objective of environmental education is the development of decision making capabilities. This includes the ability to recognize alternatives, the capacity to weigh them in terms of their consequences, the confidence to make choices between different courses of action, and the technical skill to implement these choices.

5) Environmental education is problem oriented and at present centers on the consequences of misallocation and poor management of natural resources and the failure to plan adequately for the use of land, water, and other such resources.[33]

In support of the North Carolina document, the Student

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[32] Master Plan for Environmental Education: A Proposal for New Jersey, U.S. Educational Resources Information Center, ERIC Document ED 045 478, March 17, 1970, p. 5.

[33] Thomas Baines, A State General Master Plan for Developing Environmental Education Programs in North Carolina, U.S. Educational Resources Information Center, ERIC Document ED 903 675, March, 1974, p. 3.

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Tri-Environmental Planning Study in the Portland Public Schools and the New Hampshire State Plan for Environmental Education both identify the following essential characteristics of environmental education.

1) Environmental education is an approach to teaching about man's relationship to his environment. That is, how he affects, and is affected by the world around him.

2) It is an integrated process dealing with both the natural and man made environment.

3) It is experience based learning, using the total human, natural, and physical resources of the school and surrounding community as an educational laboratory.

4) It demands an interdisciplinary approach that relates all subjects to a whole earth oneness of purpose.

5) Environmental education is directed toward survival in an urban society.

6) It is life centered and oriented toward community development.

7) It is an approach for developing self reliance in responsible, motivated members of society.

8) It is a rational process designed to improve the quality of life.

9) Environmental education is geared toward developing behavior patterns that will endure throughout life.[34]

In addition, both of the above plans state that environmental education is not:

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[34]Robert Sesar, Student Tri-Environmental Planning Study (STEPS), U.S. Educational Resources Information Center, ERIC Document ED 903 696, July, 1973, p. 11; and William B. Ewert and DeWolf Merrian, Environmental Education for New Hampshire, U.S. Educational Resources Information Center, ERIC Document ED 103 224, October, 1973, p. 6.

a) Conservation education, outdoor resource management, or nature study (although these may be included in environmental education programs);

b) A cumbersome new program requiring vast outlays of capital and operating funds;

c) A self contained course to be added to the already overcrowded curriculum;

d) Merely getting out of the classroom.[35]

Although some feel environmental education is an expansion of conservation education, it differs in that environmental education attempts to be more precise in describing human efforts to cope with the degradation of the environment.[36] With environmental education being oriented toward people, primary concern has shifted from the survival of endangered species to the survival of the human species.[37] If conservation education tends to separate man from nature, environmental education places man in the center of the "web of life."[38] Wiebe states that environmental education is more comprehensive than conservation education in that it stresses the interrelatedness of the total natural and social

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[35]Sesar, p. 11; Ewert and Merriam, p. 6.

[36]Douglas Lloyd Schaeffer, "The States and Environmental Education" (unpublished doctoral dissertation, Northwestern University, 1972), p. 16.

[37]Total Environmental Education, U.S. Educational Resources Information Center, ERIC Document ED 903 621, 1973, pp. 1-2.

[38]William E. Brown, Environmental Education Manual for New Mexico Teachers, U.S. Educational Resources Information Center, ERIC Document ED 116 947, November, 1970, p. 8.

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environment. Concerns are more global in nature and problems of urban communities as well as those of the rural community are perceived as relevant. Man replaces resource as the focus of attention and the biophysical context of conservation education is expanded to include all disciplines, integrated into the total curriculum.[39]

So, while environmental education often takes place in the out-of-doors, it is not restricted to outdoor education. Likewise, while it may concern itself with the wise use of natural resources, it is more than conservation education. It is, then, a uniquely "philosophic context that contains and influences extant teaching and learning patterns. It breaks the walls of subject matter pigeonholes and integrates them for common purposes."[40]

Goals of Environmental Education

The ultimate goal of environmental education is an environmentally literate citizenry.[41] Roth states that such a citizenry should be:

1) Knowledgeable about the biophysical and socio-cultural environments of which man is a part;

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[39]Schaeffer, pp. 14-16.

[40]Brown, p. 25.

[41]John F. Disinger, comp., A Directory of Projects and Programs in Environmental Education, U.S. Educational Resources Information Center, ERIC Document ED 114 259, February, 1975, p. 3; and A New Environmental Ethic, U.S. Educational Resources Information Center, ERIC Document ED 077 693, March, 1973, p. 9.

2) Aware of environmental problems, management alternatives of use in solving those problems; and

3) Motivated to act responsibly in developing diverse environments that are optimum for living a quality life.[42]

This requires the emphasis of problem solving techniques aimed at real problems in the local community as they are felt today or are anticipated for the future.[43]

Environmental education program goals, as stated in various state planning documents, seem to cluster in four broad categories: Cognitive goals concerned with awareness of and knowledge about the environment and environmental problems; affective goals stressing the importance of values and attitudes relating to the environment and motivation and commitment regarding environmental problem solving; goals designed to develop inquiry and problem solving skills; and finally, goals with an orientation toward the future.

Goals for environmental education programs are based, in part, on the following assumptions:

1) The environment is the totality of one's surroundings. It involves more than biological factors affected by problems like air pollution and solid waste problems. It also includes social factors that affect problems like poverty and racism:

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[42]Robert E. Roth, International and National Environmental Education, U.S. Educational Resources Information Center, ERIC Document ED 091 166, February 26, 1974, p. 2.

[43]Michigan's Environmental Future, U.S. Educational Resources Information Center, ERIC Document ED 903 588, 1973, p. 14.

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2) Awareness of environmental issues is not enough to develop an environmentally active citizenry. Experiences in solving problems are critical to achieving the stated goal.

3) When youth are given a chance to become involved in relevant issues and become part of a decision making process, they will respond creatively and learn as a result of their experiences, regardless of their original motivation.

4) Young people are more likely to throw themselves wholeheartedly into any project if they themselves have a meaningful role in the selection and planning of the project.

5) Learning takes place through the active behavior of the learner.[44]

These assumptions are reflected in the environmental education goals and objectives identified by various states.

In 1973, the State of Alabama established goals for environmental education which strive to develop citizens who are:

1) Aware of man's environment and problems related to this environment;

2) Knowledgeable concerning possible alternatives for dealing with environmental problems;

3) Motivated to undertake actions aimed at maintaining and improving the quality of the environment.[45]

In the northeastern section of the United States, Rhode Island believes that environmental education objectives should

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[44] Roselyn Glasser and others, Urban Environmental Education-Demonstration, U.S. Educational Resources Information Center, ERIC Document ED 104 643, November, 1972, pp. 1-2.

[45] Environmental Education in Alabama, U.S. Educational Resources Center, ERIC Document ED 082 984, 1973, p. 7.

encourage their citizens to develop:

1) An awareness, understanding, and respect for the environment; and

2) The skills, motivation, and action orientation to affect active involvement in current and anticipated concerns, whether personal or founded in a larger social context.[46]

In a similar vein, the Regents of the University of the State of New York identified the following specific objectives for an environmental education program.

1) To instill within students an awareness, concern, and an ability to evaluate the effects of their individual and society's action on the environment.

2) To have students develop the capacity to examine the causes of any given environmental problem and to evaluate it in a rational manner.

3) To make students aware of the constraints which inhibit changes in either individual or collective actions given the viewpoints and economic interests of the business and political community.

4) To develop student values toward actions which result ultimately in a constructive change in the environment.[47]

In the midwest, an environmental education project designed specifically around urban problems, lists the following as its program goal.

To develop an instructional program aimed at producing inner city youth that are knowledgeable concerning their social, economic, and biophysical environment,

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[46] A Proposed Plan for Environmental Education in Rhode Island, U.S. Educational Resources Information Center, ERIC Document ED 092 399, p. 6.

[47] Environmental Education, U.S. Educational Resources Information Center, ERIC Document ED 094 980, March, 1971, p. 6.

> aware of the basic methods to be employed in solving problems involving these components, and psychologically fit, motivated, and skilled to work toward their solution.[48]

In spite of its specific urban orientation, the identified program objectives reflect the same concerns of broader state goals. Specifically, this project was designed to help urban youth increase their:

1) Knowledge about urban environmental problems in their social, economic, political, and biophysical contexts;

2) Knowledge of problem solving techniques;

3) Ability to analyze issues and work toward their solutions;

4) Coping skills for dealing with environmental problems;

5) Self concept regarding their ability to work toward the solution of environmental problems.[49]

It is interesting to note that although various planning agencies have developed program criteria reflecting the cognitive, affective, and problem solving aspects of environmental education, some feel that these criteria fall short in terms of their orientation toward the future. To compensate for this concern, additional goals need to be considered for environmental education. Rocchio and Lee suggest the following:

> Given a balanced set of judgments and projections about environmental conditions, the learner must:

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[48]Glasser, p. 1.

[49]Glasser, p. 1.

1) Make value judgments and select the future environmental conditions suited for him;

2) Seek or develop alternative solutions which are most likely to result in desired future environmental conditions;

3) Use his knowledge and understanding of ecological concepts and principles in making decisions about desirable future environmental conditions and in developing or selecting alternative strategies for achieving these conditions; and

4) Take action (alone or with others) to implement a selected solution or set of solutions to environmental problems.[50,51]

Curriculum Development

In 1973, the State of New Hampshire conducted a needs assessment relevant to environmental education. Both educators and non-educators were asked to rank twenty-two goal statements from most important to least important. The average scores of the two groups showed the development of environmental education programs on a K-12 basis to be the most important goal for the state.[52] Schools are perceived as an integral component in a comprehensive environmental education plan. But how does environmental education fit into the traditional notion of schools? One accepted definition of school reads:

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[50]Rocchio and Lee, On Being a Master Planner, p. 22.

[51]Rocchio and Lee, Planning for Environmental Education, pp. 16-17.

[52]William B. Ewert and DeWolf Merriam, 1973 Needs Assessment Report, U.S. Educational Resources Information Center, ERIC Document ED 103 225, August, 1973, p. 21. Appendix E.

> The school is an institution in our society organized and supported to promote efficient learning--to assist learners in acquiring and improving the many cognitive and psychomotor abilities which previous generations required thousands of years to generate.[53]

This definition, however, places major emphasis on acquiring skills and abilities developed in the past. Environmental education is concerned with skills and abilities necessary for an ecologically sound future. The traditional notion of schools must be expanded if proper attention is to be given to those values and attitudes believed necessary for a different future.[54]

In discussing the role of the school in environmental education, William Stapp writes:

> An appropriate role for school systems to assume in environmental education is to provide the opportunity for youth to explore their environment sensorially, physically and intellectually in order to obtain both the motivating concern and the factual knowledge necessary to become an environmentally literate citizen.[55]

It is further argued that education is one process by which people come to hold certain values and attitudes. If schools are not included in environmental education planning, it is doubtful that the complex problems of the environment will

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[53]Rocchio and Lee, Planning for Environmental Education, p. 17.

[54]Rocchio and Lee, Planning for Environmental Education, p. 17.

[55]William B. Stapp, Development, Implementation, and Evaluation of Environmental Education Programs (K-12), U.S. Educational Resources Information Center, ERIC Document ED 102 960, April 2, 1973, p. 1.

ever be solved.[56]

Given that the schools have a role to play in environmental education, guidelines are needed for curriculum development. The Association for Curriculum Supervision and Development lists the following criteria for developing curriculum in environmental education.

1) Environmental education curriculum should be interdisciplinary, incorporating concepts and processes from various disciplines with particular emphasis on natural, physical, and social sciences.

2) Environmental education should be an integral, non-appendage curricular component.

3) The process of inquiry should be the prime vehicle for involving pupils in environmental problem solving.

4) Appropriate emphasis should be given to studying the total environment; the interrelationships of natural, social, and man made environments.

5) An appropriate balance in emphasis should be given to the cognitive, affective, and psychomotor domains of educational objectives. If one is to be emphasized, it should be the affective domain.

6) Environmental education experiences should be in tune with the developmental stages of children.

7) Environmental education programs should be planned on a school/community basis.

8) The utilization of carefully selected teaching aids and materials is essential.[57]

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[56] Project Termination Report for ESEA Title III Grant for the period August 15, 1971 and August 14, 1974, U.S. Educational Resources Information Center, ERIC Document ED 102 026, November 14, 1974, p. 7.

[57] Urban Environment Studies Curriculum Project, U.S. Educational Resources Information Center, ERIC Document ED 118 628, June 30, 1975, p. 13.

William B. Stapp, speaking to the issue of developing and implementing instructional programs in environmental education on a K-12 basis, suggests the following curricular organization.

1) Environmental education should span the curriculum K-12. Environmental experiences at every level will capitalize on the cumulative effects of the program.

2) The program should link subject areas that relate most closely to the environment (especially science and social science) so that all knowledge necessary for problem solving is developed.

3) Integrate and correlate the program with existing curriculum in a manner that enhances instructional goals.

4) The program should strive to increase interest in, awareness of, and sensitivity toward the environment.

5) It should be participant centered, stressing active learning and attitude development through personal experiences.

6) The focus should be on the local environment but not to the exclusion of regional, state, national, and international environmental problems.

7) The focus should be on contemporary issues in a process oriented approach.

8) The program should stress attitude formation, value clarification, critical thinking, problem solving, and social change strategies.

9) The focus should be on the future with a global orientation. Implicit here is the concept of spaceship Earth.

10) The program should provide a comprehensive in-service program for teachers.[58]

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[58]William B. Stapp, Materials, Ideas, and Questions to Serve as a Basis for Preparing a Position Paper Regarding the Development and Implementation of Instructional Programs

A review of environmental education programs for school administrators published in December, 1971, lists the following as elements common to environmental education programs.

1) These programs have a multidisciplinary approach with emphasis on the interrelationships of man and nature.

2) The focus is on contemporary problems relating to the urban and rural environments--both man made and natural.

3) They stress the incorporation of nonformal as well as formal education processes and utilize facilities outside the classroom.

4) They emphasize the development of understanding and attitudes as well as information.

5) There should be involvement of all age groups.

6) They emphasize a participant centered design involving each learner/participant in choosing priorities both as to the issues to be studied and the solutions that seem most appropriate. This design allows participants to learn "how to learn" about new situations, how to weigh alternatives, and how to test solutions.[59]

This same report goes on to state that while an analysis of the literature showed certain elements to be essential to environmental education, the reality in the schools was quite different. Schools were not developing programs on a widespread basis and although there were some examples in evidence

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in Environmental Education (K-12), U.S. Educational Resources Information Center, ERIC Document ED 076 412, March 6, 1973, pp. 11-12.

[59]Stanley L. Hegelson and others, A Review of Environmental Education for School Administrators, Volume III of III, U.S. Educational Resources Information Center, ERIC Document ED 059 915, December, 1971, p. 6.

at the elementary and secondary level there did not appear to be any coordination on a K-12 basis. Those programs being developed did not stress broad concepts and problem solving and were not oriented toward active learning. Most programs stressed the environment outside the city, while little emphasis was being devoted to local urban problems. Although many programs were seen as making progress toward an interdisciplinary framework, most curricular materials were oriented toward science or conservation. Finally, most programs existed only within the school itself with few succeeding in obtaining community involvement.[60]

One key assumption regarding environmental education in the public schools is that environmental education concepts will be integrated into the present subjects of the curriculum.[61] An interdisciplinary framework is considered by many to be crucial to environmental education, although such an approach is not perceived as essential by everyone. Kormondy does not advocate the narrow training of specialists, believing rather that there is a need for the humanistic influence in environmental education.[62] But in regard to an

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[60]Hegelson and others, pp. 10-11.

[61]Environmental Education, Preservice Preparation of Teachers, U.S. Educational Resources Information Center, ERIC Document ED 082 998, June, 1973, p. 1.

[62]Edward J. Kormondy, "Environmental Education: The Whole Man Revisited," American Biology Teacher 33 (1971):17.

interdisciplinary framework for environmental education, he states:

> There is . . . a great hue and cry for interdisciplinary courses and curricula. These are to the well and good insofar as they produce the "well rounded" man and the specialist who sees the broad spectrum. But the kinds of difficult problems we face cannot be resolved by environmental dilettantes, by individuals who have had a bit of this and that. These problems can be solved or compromised only at the hands of exquisitely tuned specialists who bring to bear the discipline of their discipline, the expertise of their restricted sphere of knowledge. These are not interdisciplinarians, but are disciplinarians.[63]

Ost defines interdisciplinary as a "term applied to courses of study which merge for purposes of instructional expediency, two or more bodies of knowledge."[64] In parallel thought, Hepburn and Simpson argue for an interdisciplinary approach to curriculum, stating that the separate teaching of school subjects does not adequately prepare students for the real world.[65] "The separation of subjects in the curriculum, however strong internally, tends to neglect the larger problem of mankind which education seeks to solve."[66] They believe the interdisciplinary approach fails in schools because of the deeply engrained tradition of disciplines as

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[63]Kormondy, p. 17.

[64]D. H. Ost, "Changing Curriculum Patterns in Science, Math, and Social Studies," School Science and Mathematics 75 (January 1975):48-49.

[65]M. A. Hepburn and R. D. Simpson, "Can the Curriculum Save Us? Science and Social Science," Social Studies 66 (March 1975):66.

[66]Ibid., p. 65.

a part of our academic system.[67] Ost maintains that there is generally no theoretical basis for an interdisciplinary curriculum, instructional strategy, or program. Interdisciplinary approaches fail, he believes, because instructors fail to integrate the content of their respective disciplines. Such attempts usually end up as a series of mini-courses with the burden of tying everything together left to the student.[68]

Cummings states that environmental education does not belong to any one discipline. But is it multi-disciplinary, trans-disciplinary, or interdisciplinary? Whichever label is used, he believes content from one discipline needs to be disassembled and reintegrated with content from other disciplines, into a framework that leads outward, rather than inward, toward unification of, rather than reduction to elementary units.[69]

A review of the literature reveals that a values component is considered essential to environmental education. Cummings believes that simple behavior change and acquisition of academic skills is not enough and that environmental education must develop an "ecologically valid social ethic." Implied in this concept is a change in values that would

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[67] Ibid., p. 66.

[68] Ost, p. 49.

[69] S. L. Cummings, "Environmental Education, The Central Need," American Biology Teacher 35 (November 1973): 448.

affect large clusters of behavior.[70] In a similar vein, Agne and Nash state that until environmental education programs help us see the direct cause/effect relationship between what we value as Americans and the damage we do to our environment, there is little hope in resolving environmentally oriented issues such as the energy crisis.[71]

In a document designed to facilitate the long range planning of environmental education, Horn emphasizes the values component in defining the concept.

> Environmental education is the process of recognizing and clarifying the values, attitudes, and concepts necessary to understand and appreciate the interrelatedness among man, his culture, and his biophysical environment. Moreover, environmental education entails practice in decision making about issues concerning environmental quality.[72]

Likewise, at the state level, New Hampshire stresses the importance of values in setting down guidelines for environmental education.

> Environmental education is an extension of ethics and should modify attitudes and values to develop an environmental concern. This concern not only involves the individual and his personal interest, but his

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[70] Cummings, p. 449.

[71] R. M. Agne and R. J. Nash, "Environmental Education: A Fraudulent Revolution?" Teacher's College Record 76 (December 1976):305.

[72] B. Ray Horn, Long Range Educational Planning and the Environment, U.S. Educational Resources Information Center, ERIC Document ED 079 073, November, 1972, p. 12.

interrelationships with others and society, even the survival of society.[73]

In the state of Washington a high school biology course, designed for the purpose of investigating environmental problems also reflects a concern for values education. The objectives, in part, read:

1) The student will recognize the following deeply implanted, pathogenic premises as having to be replaced with values consistent and compatible with an ecological ethic;

   a) The reductionist view of man. That is, man is nothing but a biochemical mass. The whole is explained in terms of the parts;

   b) The suppositions that men are separate; that man has no responsibility to his fellow man, nor for future generations;

   c) The dualistic view of man and nature; that man must fight and conquer nature; ie. nature is the enemy;

   d) The view that economic expansion is the same as economic health; ie. economic stability is unhealthy; and

   e) The sacrosanct view of our nation that fosters nationalism, blind patriotism, and imperialism.[74]

Additional objectives for this program deal with such value laden topics as world population growth and control, frugality regarding resource use, and perception of self as a

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[73]Ewert and Merriam, Environmental Education for New Hampshire, p. 34.

[74]William Reinard, Investigating Environmental Problems in a High School Biology Class, U.S. Educational Resources Information Center, ERIC Document ED 100 777, December, 1971, p. 2.

major contributor to the environmental crisis.[75]

There seems to be widespread agreement concerning the inclusion of values education within environmental education programs, even though differences of opinion are apparent regarding the role values play. Some writers emphasize the inculcation of a specific set of attitudes relating to a particular environmental problem. Linksy, for example, believes that "our very survival depends on the inculcation of an attitudinal ethic that will provide a pivot point for survival" and sees the schools as providing the optimum opportunity to design programs which will achieve this purpose.[76] He further states that an attempt must be made to "break the classical patterns of education and direct the attitudes of students toward a positive appreciation of the environment."[77] In supporting the same approach, Kormondy states:

> . . . environmental education must have as its fundamental aim, an alteration of attitudes based on an understanding and appreciation of man's place in the nature of things; it is obligated to provide the data in support of this understanding and on which sound decisions affecting man's survival can be made.[78]

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[75]Ibid., pp. 2-3.

[76]Ronald B. Linsky, "Environmental Strategies for an Environmental Ethic," The Science Teacher 38 (January 1971):17.

[77]Ibid., p. 18.

[78]Kormondy, p. 16.

Those advocating the inculcation of environmentally sound values approach the values component of environmental education with an almost missionary zeal. Kormondy concludes his article by stating that there is here an "almost spiritual insertion into the education process."[79]

Others believe the methodology of values clarification to be more relevant. At the state level, Minnesota's guidelines regarding values, state that environmental education should:

> . . . encourage the teaching of skills through which values are formed rather than advocating any particular value or set of values. That is, students should be taught how to think, not what to think.[80]

Values clarification, as it relates to its role in environmental education in Michigan, is perceived as the recognition and clarification of beliefs and attitudes that form environmentally sound values. An individual must recognize and understand all the implications of holding certain beliefs, attitudes, and values before he or she can rationally decide whether or not to revise them.[81] To this end, the rationale for using a values clarification strategy in environmental education has been summarized by one title grant thusly:

> The individual is more likely to accept positive values toward the environment if he has arrived at those

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[79]Ibid.

[80]Urban Environment Studies Curriculum Project, p. 12.

[81]Michigan's Environmental Future, p. 15.

> values through the process of critical thinking, than by accepting the values supposedly held by a teacher. Critical thinking requires the individual to do his own thinking. Positive results in society are more likely to happen if they come about because of individual action based on critical thinking, than upon a blind acceptance of values which one is told are right. If the school will improve the quality of learning and the intellectual capabilities of students, then social problems have a chance of solution. In addition, in a society such as ours, one that permits as much freedom as it does, a purpose such as we endorse allows the school to escape the charge of indoctrination. Better to train the individual in the process of critical thinking than feed him predetermined sets of beliefs which he is to accept upon the authority of others.[82]

Those advocating a clarification approach to the values component of environmental education believe that students will ultimately arrive at ecologically sound values regarding the environment. At the state level, Alabama believes that environmental education should reinforce the responsibility of maintaining and improving the quality of the environment. This should be accomplished through total student involvement, open ended investigations involving inquiry, experiences that utilize the basic learning skills in environmental encounters, and utilization of both school and community resources.[83] In a similar vein, the Center for the Development of Environmental Curriculum states that environmental education programs should begin with investigations in the child's immediate environment. These investigations should involve students

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[82] Project Termination Report for ESEA Title III Grant, p. 22.

[83] Environmental Education in Alabama, pp. 10-11.

in all phases of planning, learning, and evaluation; employ learning strategies involving discovery, inquiry, and problem solving techniques; get the student outdoors as much as possible; and effectively involve the people and resources of the entire community. The report goes on to state that "all students, regardless of age, should be allowed to accept the responsibility for some aspects of environmental quality through the opportunity to exert control over their environment at school, at home, in the neighborhood, and in the community."[84]

Stapp states that while traditional teaching models often separate course content from the environment with the teacher portrayed as a conveyor of knowledge, a more desirable model for environmental education has the student and teacher interacting within a given learning situation where the environment is the content.[85] Stapp believes this to be the appropriate model for environmental education because "research studies have shown that teachers are highly effective when they participate in learning projects as 'team members,' guides, and counselors rather than as star performers."[86]

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[84] Project Termination Report for ESEA Title III Grant, p. 61.

[85] Stapp, Materials, Ideas, and Questions, pp. 19-22.

[86] Ibid., p. 20.

Getting children outdoors is an essential component of environmental education methodology. Cummings states that environmental education is founded in actual experience rather than exposure to the abstract. In the outdoors, he becomes a knowledge seeker rather than a knowledge receiver. Seeking implies active behavior and willing participation on the part of the student.[87] Such experiences should be of appropriate difficulty for the age level involved and take into account the developmental levels of children. They should employ all the senses and, for the most part, be guided experiences, although the authors believe that some unguided experiences can be useful and should be developed.[88]

Problem solving and decision making are also identified as important aspects of environmental education. There is a diversity of agreement as to the specifics involved in the process of problem solving. Glasser supports a reasonable approach: defining the problem; analyzing alternative solutions; choosing the most rational and environmentally sound alternative; designing a plan of implementation; implementing the plan; and evaluating its effect.[89] Case summarizes

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[87]Cummings, p. 449.

[88]Proceedings of the Canadian Camping Association Outdoor Education Conference, U.S. Educational Resources Information Center, ERIC Document ED 106 010, October 6, 1974, p. 31.

[89]Glasser, p. 13.

the importance of these skills in the following statement:

> If young people are to become intelligent participants in society, in part capable of reasoned environmental management decision making, the educational process in schools must include opportunities totally involving the learner.[90]

Cummings sees decision making as appropriate across many disciplines and grade levels. It is not so much concerned with outcomes as it is with the ways in which outcomes are determined. He states that the decision making process provides a means for integrating inquiry and experience learning into a valuing process which leads to action.[91] It was stated previously that awareness of environmental issues is not enough to produce environmentally active citizens, yet experiences in solving problems are critical to achieving this stated goal. Glasser probably speaks for many in the field when she emphasizes that if youth is given a chance to participate in the decision-making process involving relevant problems, they will respond creatively and learn as a result of their experiences.[92]

One of the major constraints to environmental education is the shortage of prepared teachers.[93] Inasmuch as

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[90]Sharon Case, ed., and others, Living Education, U.S. Educational Resources Information Center, ERIC Document ED 113 150, 1975, p. 5.

[91]Cummings, p. 450.

[92]Glasser, p. 2.

[93]Stapp, Development, Implementation, and Evaluation of Environmental Education Programs, p. 3.

environmental education is relatively new on the scene and therefore lacks the tradition of other subject areas, many teacher education institutions do not include environmental education as part of their program.[94] In this formative stage of teacher preparation, assumptions regarding environmental education in public schools have a direct bearing on higher education and its program development.

1) Environmental education concepts will be integrated into the present subjects of the curriculum.

2) Most of the teaching will be by regular classroom teachers. Few school systems will employ the talents of an environmental education specialist.

3) The key people in environmental education are prospective elementary school teachers and those specializing in science and social science at the secondary level.[95]

Another point of concern deals with the lack of programs stressing interdisciplinary approaches to the field. Roberts and Dyrli lament the lack of teacher training in environmental education as a major constraint to curriculum development. They state:

> Curricula that develop a truly interdisciplinary ecological approach are almost non existent, and for good reason. Science and social science teachers do not, generally, have the necessary competencies to handle such a task. Furthermore, it is quite difficult to acquire the necessary training since colleges and

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[94] J. R. Kelly and E. P. White, "Developmental Framework for Planning Environmental Education Programs," Science and Children 12 (April 1975):14.

[95] Environmental Education, Preservice Preparation of Teachers, p. 1.

> universities, with few exceptions, do not offer the opportunities for cross discipline training in the sciences and in the social sciences. Only now are we realizing that both of these areas need to be involved if we are to live in harmony with our environment.[96]

In 1973, Dr. Sigmund Abeles of the Connecticut State Department of Education inventoried the certification requirements of forty-seven states. He found that although the state of Wisconsin offered a secondary certification in environmental education no state offered certification at the elementary level. Seven states favored certification in environmental education, twenty-three opposed it, while seventeen gave no response. Montana, Oregon, and Wisconsin indicated a separate course in environmental education as an elementary certification requirement, while Wisconsin and Oregon also indicated it was required for secondary certification.[97] On the positive side, all fifty states, Washington, D.C., and Guam have designated environmental education coordinators who spend at least one half of their time in the area of program development.[98]

Compounding the problem of teacher preparedness is a lack of knowledge at the local level concerning strategies for implementing environmental education programs. In New

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[96]Arthur D. Roberts and Odvard Egil Dyrli, "Environmental Education," The Clearing House 45 (April 1971):455.

[97]Roth, p. 25.

[98]Ibid., p. 29.

Hampshire, a needs assessment asked both educators and non educators to rank various implementation strategies for environmental education. The results showed that providing teachers and school administrators with environmental information and classroom techniques ranked second.[99] Again at the state level, the North Carolina Master Plan urges universities to submit recommendations for:

1) The most effective way to change certification requirements of primary and intermediate teachers to include instruction in the environment and natural resources;

2) The most effective way of changing certification requirements for secondary teachers to include interdisciplinary courses in environmental quality and management; and

3) The most effective way of providing every teacher in the state with a sufficient interdisciplinary background to allow the inclusion of an environmental perspective in every course taught.[100]

In addition, it is believed that implementation strategies should include in-service training in the form of workshops, seminars, and summer course work, possibly through university demonstration and research centers.[101,102]

It is believed that the implementation of an environmental education program at the local level should include

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[99]Ewert and Merriam, Needs Assessment, p. 25. Appendix F.

[100]Baines, pp. v-7.

[101]S. A. Welisch, "Environmental Ecological Education," Educational Forum 38 (January 1974):156.

[102]Urban Environment Studies Curriculum Project, p. 4.

the services of a project coordinator and/or resource assistant.[103] The State of Indiana lists the following job description for an environmental education coordinator. The coordinator should:

1) Provide continuity and coordination for a K-12 curriculum. He or she should have the background and time to keep abreast of community environmental plans and developments and coordinate their use into meaningful learning experiences;

2) Provide a direct link between the school and community environmental education learning experiences and projects;

3) Provide in-service teacher training and cope effectively with any continuity programs which might occur because of teacher turnover;

4) Contribute to meeting adult education needs related to community environmental education; and

5) Become a resource for students engaged in independent and group environmental studies and activities.[104]

The teacher education program is central to environmental education. If schools are to accept the responsibility of producing an environmentally literate citizenry, steps must be taken to prepare teachers who can help to achieve this goal. As Welisch states, most children do not receive a high quality environmental education because teachers are not adequately trained.[105]

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[103] Ibid.

[104] Total Environmental Education, p. 12.

[105] Welisch, p. 156.

Summary

This review of literature highlights several generalizations regarding environmental education. First, it is not a new phenomenon. Many of the present concerns relevant to the environmental education movement can be traced back to the late nineteenth and early twentieth centuries. There is today, a greater sense of urgency regarding environmental problems, but educators have long been concerned with environmental quality.

Second, there is no universally accepted definition of environmental education. The philosophical context one brings to environmental education will determine the definition and the goals and objectives of the program. If the concern is with the acquisition of knowledge, the definition will be content oriented and the goals and objectives will reflect a cognitive emphasis. A concern with problem solving, decision making, and values will be reflected in a process or skill oriented definition with goals and objectives showing an affective emphasis.

Third, the ultimate goal of environmental education is an environmentally literate citizenry. Implicit in this goal is the assumption that such a citizenry would be aware of both present and future environmental problems, knowledgeable concerning these problems, skilled in problem solving techniques, and motivated to do something about environmental quality. An environmental education program designed to

produce such a citizenry, must then, provide students with experiences that will enhance their intellectual and emotional capabilities with regard to each of these components.

Fourth, the literature suggests that curriculum should be developed for all students, K-12. Programs should be interdisciplinary in nature and integrated into the existing curriculum. But while regular classroom teachers are expected to operate within an interdisciplinary framework, integrate environmental education concepts into their teaching, deal with value laden issues, and use inquiry to teach problem solving and decision making skills, little has been done to prepare them for this task.

This review suggests that tentative criteria for environmental education do exist. There is some agreement among professionals in the field regarding program goals, curriculum development, instructional strategies, and facilitative resources. It also points to an ambiguity that serves as a hindrance to meaningful curricular efforts. This failure to adequately define environmental education, may in part be due to a lack of identifiable, minimal criteria for environmental education.

CHAPTER III

RESEARCH DESIGN AND METHODOLOGY

As the ultimate significance of research is heavily influenced by its design approach, Chapter III examines the methodology used in the identification and validation of the tentative criterion listing, selection of the validation jury, development of the survey instrument and selection of the sample. In addition, specific hypotheses are examined and appropriate statistical tests outlined.

While the initial phase of this research was concerned with the validation of a minimal criterion listing for environmental education programs, the study had as its subsequent goal a determination of the extent to which these minimal criteria were presently embodied in established environmental education programs, as well as the extent to which these minimal criteria should be embodied in established programs. Because the research was concerned with "determining the nature and degree of existing conditions," a descriptive design was utilized.[1]

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[1]Irving J. Lehman and William A. Mehrens, Educational Research: Readings in Focus (New York: Holt, Rinehart and Winston, 1971), p. 95.

Materials and Data Collection

From the review of the literature, twenty-four tentative criteria for environmental education programs were identified and a validation instrument constructed. (See Appendix A.) The criteria validation instrument was designed to solicit the expert opinion of a critic jury with regard to each of the twenty-four criteria. Each juror was asked to indicate the extent to which he believed a criterion was valid by selecting one of the following categories:

A) The criterion is very important for environmental education and an environmental education program should definitely meet this criterion.

B) The criterion is of some importance for environmental education, but it is not crucial that an environmental education program meet this criterion.

C) The criterion is of no importance for environmental education.

During the spring of 1977, seventeen individuals were invited to membership on a nationally select criteria validation jury for environmental education. Criteria for selection of the jurors included the following:

1) Recognized expertise in the field of environmental education, as evidenced by publications or other citation of achievement.

2) A national representation was sought in order that the validation would transcend any regional or sectional bias.

3) A cross sectional representation attempted to include individuals from universities, research agencies,

and state departments of education.

All seventeen of the prospective jurors responded to the invitation for membership on the jury. Fourteen were able to participate in the study and the author-designed validation instrument was mailed. A listing of individual jurors is noted in Appendix E. The results of the jury validation are reported in Table 1. Results of the jury validation show considerable support for the criterion listing. This, along with the support generated in the professional literature suggests that the criteria are valid for environmental education programs.

As a result of the jury validation, a questionnaire was developed. (See Appendix B.) Questions in Part I of the questionnaire were designed to gather information concerning the sex, age, experience, academic background, and community population of the respondent. Questions in Part II of the questionnaire suggested conditions for environmental education programs which embodied the validated criteria. Respondents were asked to respond twice to each question. The first response indicated the extent to which the respondents perceived a given condition to exist in their environmental education program at the present time. These responses are reported in the section Conditions As They Are with regard to the validated criteria. The second response indicated the extent to which the respondents believed a given condition should exist in their environmental education

TABLE 1

FREQUENCY AND PERCENTAGE OF RESPONSES BY CRITIC JURY
ON CRITERION VALIDATION INSTRUMENT

Criterion	Response A Frequency (percent)	Response B Frequency (percent)	Response C Frequency (percent)
1. Curriculum for environmental education should be designed and implemented on a K-12 basis.	13 (92.9)	1 (7.1)	0 (0.0)
2. An environmental education program should be integrated into existing curricula. It should not be designed and implemented as an additional subject area.	12 (85.7)	2 (14.3)	0 (0.0)
3. Environmental education does not belong to any single discipline. The curriculum should include concepts and generalizations from many disciplines, primarily the natural and social sciences.	14 (100.0)	0 (0.0)	0 (0.0)
4. Environmental education curricula should emphasize the importance of ecologically sound human values.	13 (92.9)	1 (7.1)	0 (0.0)
5. The focus of environmental education curricula should be on real problems in the student's environment.	12 (85.7)	2 (14.3)	0 (0.0)
6. Environmental education curricula should emphasize man's relationship to his natural, social, and man-made environment. This includes both the urban and rural environments.	13 (92.9)	1 (7.1)	0 (0.0)
7. An environmental education program should have a formalized statement of goals and objectives.	12 (85.7)	2 (14.3)	0 (0.0)

TABLE 1 (cont'd.)

Criterion	Response A Frequency (percent)	Response B Frequency (percent)	Response C Frequency (percent)
8. Environmental education curricula should incorporate directed learning experiences in the outdoor environment.	10 (71.4)	4 (28.6)	0 (0.0)
9. In conjunction with the recognition of environmental problems, environmental education curricula should provide students with factual knowledge concerning their environment.	11 (78.6)	3 (21.4)	0 (0.0)
10. Environmental education curricula should incorporate and utilize resources within the local community.	13 (92.9)	1 (7.1)	0 (0.0)
11. The development of environmental education curricula should include student input during the planning, implementation, and evaluation stages.	8 (57.1)	6 (42.9)	0 (0.0)
12. In addition to being concerned with present environmental problems, environmental education curricula should be oriented toward future environmental concerns.	14 (100.0)	0 (0.0)	0 (0.0)
13. Instructional strategies for environmental education should make use of values clarification techniques.	10 (71.4)	4 (28.6)	0 (0.0)
14. Instructional strategies for environmental education should make use of the inquiry method.	8 (57.1)	5 (35.7)	1 (7.1)
15. Instructional strategies for environmental education should facilitate the student's development of problem solving skills.	12 (85.7)	2 (14.3)	0 (0.0)

TABLE 1 (cont'd.)

	Criterion	Response A Frequency (percent)	Response B Frequency (percent)	Response C Frequency (percent)
16.	Instructional strategies for environmental education should allow students to make decisions concerning real environmental problems and to evaluate the consequences of those decisions.	13 (92.9)	1 (7.1)	0 (0.0)
17.	Instructional strategies for environmental education should be action oriented, employing "hands on," experience based learning activities.	12 (85.7)	2 (14.3)	0 (0.0)
18.	Instructional strategies for environmental education should facilitate the student's development of those process skills associated with data gathering and reporting.	9 (64.3)	5 (35.7)	0 (0.0)
*19.	A system wide environmental education program should have a designated coordinator who is responsible for curriculum development and facilitating the classroom teacher in implementing instructional strategies.	7 (53.8)	6 (46.2)	0 (0.0)
*20.	All teachers of environmental education should have access to a staffed environmental education resource center away from the school.	2 (15.4)	8 (61.5)	3 (23.1)
*21.	All teachers of environmental education should be provided with a continuing in-service education program relevant to all components of environmental education.	11 (84.6)	1 (7.7)	1 (7.7)

TABLE 1 (cont'd.)

Criterion	Response A Frequency (percent)	Response B Frequency (percent)	Response C Frequency (percent
*22. All teachers of environmental education should show evidence of completed coursework at a college or university, relevant to environmental education.	6 (46.2)	4 (30.8)	3 (23.1)
*23. Teachers of environmental education should meet minimal state certification requirements for environmental education.	5 (38.5)	4 (30.8)	4 (30.8)
*24. The goals and objectives of local environmental education curricula should reflect statewide goals and objectives as set forth in a state master plan for environmental education.	9 (75.0)	3 (25.0)	0 (0.0)

*One juror failed to respond to the final six criteria. One additional juror failed to respond to criterion 24.

program. These responses are reported in the section Conditions As They Should Be with regard to the validated criteria. Questions in Part II of the questionnaire, then, provided a measure of the validated criteria's current status in environmental education programs (Conditions As They Are), as well as a measure of the criteria's perceived importance for environmental education programs (Conditions As They Should Be).

In addition, selected questions contained subscales for the Elementary, Junior High, and Senior High levels. In the six questions where this distinction was included, the conditions refer specifically to student role and participation in an environmental education program. This component was included to provide respondents with the opportunity to relate the conditions suggested by these items to a specific grading pattern, in the event their program was not K-12. In addition, it provided a measure of a condition's relative importance at each level for both Conditions As They Are and Conditions As They Should Be.

The questionnaire was initially critiqued by cooperating science educators, social studies educators, and research specialists. Subsequently, the questionnaire was submitted for trial study to approximately one hundred college level students at Miami University during the summer of 1977. As a result of these critiques, the final version of the questionnaire was formulated. A cover letter was written for

duplication with the questionnaire that outlined the purpose of the research and stressed the importance of each respondent's contribution. (See Appendix D.)

The program population was drawn from A Directory of Projects and Programs in Environmental Education, compiled by John F. Disinger.[2] Of the 207 projects and programs listed in the directory, 51 were identified as school based programs and 83 as project based programs. The school based programs were defined as those based in a specific school system and serving students within that system. Project based programs were defined as environmental education programs not based in a specific school system, but which identified school children from surrounding areas as a portion of their target audience.

It was assumed for purposes of this research, that the population was representative of established environmental education programs. This assumption was based on the ongoing revision of the directory itself and the representation of all geographic regions in the United States. Of the 137 questionnaires mailed to selected respondents, 130 were returned for a return rate of 94.8%. Ten returns were either incomplete or returned too late to be included in the study, leaving a useable total of 120 or 87.5%. Appendix C

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[2]John F. Disinger, A Directory of Projects and Programs in Environmental Education, U.S. Educational Resources Information Center, The Ohio State University, December, 1976.

contains a listing of all programs included in this population.

Data Analysis

The specific objectives that guided this research were stated as follows:

1) To identify, through a review of the literature, a list of tentative criteria for environmental education.

2) To determine if individuals with expertise in environmental education perceive this criterion listing as valid.

3) To determine the extent to which directors of established environmental education programs perceive these criteria as being contained within their programs.

4) To determine the extent to which directors of established environmental education programs believe these criteria should be contained within their programs.

5) To determine if differences exist between what program directors perceive to be the real status of the validated criteria in their programs (Conditions As They Are) and what they believe to be the ideal status of the criteria in their programs (Conditions As They Should Be).

Data collected in Part I of the questionnaire were computed to indicate the frequency and percentage of respondents with regard to age; sex; the number of years the respondent had been involved with environmental education; the respondent's involvement with public or private schools; the position title of the respondent within schools, if applicable; the academic background of the respondent; and the population of the community served by the respondent's

program. Using the Statistical Analysis System,[3] the frequency, cumulative frequency, percent, and cumulative percent of these data were calculated.

The data gathered in Part II of the questionnaire were analyzed to provide information for objectives three, four, and five. The statistical analysis provided information which indicated the extent to which the validated criteria were currently embodied in established environmental education programs; the extent to which the validated criteria should be embodied in established environmental education programs; and the extent to which differences exist between established conditions (Conditions As They Are) and ideal conditions (Conditions As They Should Be) for environmental education programs in the population.

Part II of the questionnaire contained questions which suggested conditions for environmental education programs, each of which was related to a specific criterion contained in the validated criterion listing. Respondents were asked to indicate their perceptions twice for each question. The first response served as an indicator of Conditions As They Are (ARE Variables) and the second response served as an indicator of Conditions As They Should Be (SHOULD Variables). There was a total of 38 responses for both the ARE Variables and the SHOULD Variables.

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[3]Barr, Goodnight, Sall and Hewig, Statistical Analysis System Institute Inc., Raleigh, North Carolina.

Responses were recorded numerically according to categories shown in Table 2.

TABLE 2

RESPONSE CATEGORIES FOR PART II OF THE ENVIRONMENTAL EDUCATION SURVEY INSTRUMENT

Response	Conditions As They Are ARE Variables	Conditions As They Should Be SHOULD Variables
0	Do Not Know	Do Not Know
1	Condition Does Not Exist	Condition Should Not Exist
2	Condition Exists Slightly	Condition Should Exist Slightly
3	Condition Exists Moderately	Condition Should Exist Moderately
4	Condition Exists To A Large Extent	Condition Should Exist To A Large Extent
5	Condition Exists To A Very Large Extent	Condition Should Exist To A Very Large Extent

In order to facilitate the analysis of the data generated by this research, questions from Part II of the survey instrument were grouped around four theoretical constructs. While the questions were randomly listed in Part II of the questionnaire, an analysis of their content revealed that some items were designed to provide information regarding student role and participation in environmental education

activities during various stages of their K-12 school experience (Time). Other items revealed information pertaining to instructional strategies used in environmental education programs (Content-Means); desired learning outcomes for environmental education programs (Content-Ends); and administrative factors for environmental education programs outside the realm of the classroom (Program). Like the individual items within the aggregate, each aggregate contained a component for Conditions As They Are (ARE Variables), as well as Conditions As They Should Be (SHOULD Variables).

Individual items were initially grouped around these four constructs according to the judgment of cooperating research specialists. In addition, for both the ARE Variable and SHOULD Variable components, correlation coefficients were computed which established the relationship between the individual item means within the aggregate and the aggregate mean. A high positive correlation coefficient indicated tight cohesiveness between a given individual item mean within the aggregate and the aggregate mean.

Time Aggregate

Correlation coefficients for the Time Aggregate are provided in Table 3. The Time Aggregate consisted of an Elementary, Junior High, and Senior High subgroup, each of which was statistically defined as the average of the mean ARE Variable and SHOULD Variable scores at each level for

TABLE 3

CORRELATION COEFFICIENTS MEASURING COHESIVENESS FOR INDIVIDUAL ITEM MEANS WITHIN THE TIME AGGREGATE AND THE MEAN TIME AGGREGATE SCORE FOR CONDITIONS AS THEY ARE AND CONDITIONS AS THEY SHOULD BE

	Conditions As They Are	Conditions As They Should Be
1. Students in all grades, K-12, receive instruction in environmental education.	.12* .03** .18***	.26* .16** .24***
2. Students who participate in your environmental education program attend a special environmental education class:		
a. In the Elementary School	.31	.39
b. In the Junior High School	.25	.46
c. In the Senior High School	.07	.38
3. Students who participate in your program do not attend a special environmental education class. They receive instruction as part of their regular coursework:		
a. In the Elementary School	.70	.56
b. In the Junior High School	.69	.53
c. In the Senior High School	.66	.54
11. Students who participate in your program have meaningful input regarding the planning, implementation, and evaluation of environmental education activities:		
a. At the Elementary level	.68	.67
b. At the Junior High level	.77	.60
c. At the Senior High level	.74	.61

TABLE 3 (cont'd.)

	Conditions As They Are	Conditions As They Should Be
12. Students who participate in your environmental education program work at solving real problems in their environment rather than simulated or textbook problems:		
a. At the Elementary level	.78	.72
b. At the Junior High level	.79	.68
c. At the Senior High level	.81	.65
18. Students who participate in your environmental education program are given the opportunity to develop alternative solutions to real environmental problems, decide on a solution to the problem, act according to that decision, and evaluate the consequences:		
a. At the Elementary level	.74	.73
b. At the Junior High level	.79	.76
c. At the Senior High level	.77	.71
19. Instructional strategies in your environmental education program facilitate the development of those process skills associated with data gathering and reporting:		
a. At the Elementary level	.58	.60
b. At the Junior High level	.72	.58
c. At the Senior High level	.77	.70

*Correlation coefficient - item 1 and Elementary subgroup.
**Correlation coefficient - item 1 and Junior High subgroup.
***Correlation coefficient - item 1 and Senior High subgroup.

the items listed in Table 3. For each of these items, program directors indicated the extent to which these conditions suggested by the criteria are and should be in evidence in their environmental education programs at the Elementary, Junior High, and Senior High levels. The six items where this distinction is made relate to student input or student participation in environmental education activities and includes student participation in an integrated curriculum; meaningful student input regarding the planning, implementation, and evaluation of environmental education activities; student participation in solving real problems in the environment rather than simulated or textbook problems; student involvement in the decision making process regarding "real World" environmental problems; and student participation with regard to developing those process skills associated with data gathering and reporting. In addition, item one is included as a subgroup in this aggregate because it provides information pertaining to the inclusion of environmental education curriculum on a K-12 basis.

Question two was stated in opposition to the validated criterion which suggests that environmental education should be integrated into the existing curriculum. Therefore, the numerical responses for this item have been statistically reversed.

Analysis of the data provided by the Time Aggregate revealed information which indicated the varying degree

directors of established environmental education programs perceived the validated criteria suggested by these items as being currently embodied in their program at the Elementary, Junior High, and Senior High levels, as well as the extent to which these criteria should be embodied at each of these levels.

Content-Means Aggregate

Correlation coefficients for the Content-Means Aggregate are shown in Table 4. The Content-Means Aggregate was statistically defined as the average of the mean ARE Variable and SHOULD Variable scores for the individual questions listed in Table 4. Directors of established environmental education programs reported their perceptions regarding the extent to which teachers and staff in their program currently utilize instructional strategies suggested by the validated criteria, as well as the extent to which these instructional strategies should be utilized in their program. Methodology suggested by items within this aggregate include use of the outdoors and "hands on" activities, as well as strategies involving inquiry, values clarification, and problem solving.

Content-Ends Aggregate

Correlation coefficients for the Content-Ends Aggregate are reported in Table 5. The Content-Ends Aggregate was statistically defined as the average of the mean ARE

TABLE 4

CORRELATION COEFFICIENTS MEASURING COHESIVENESS FOR INDIVIDUAL ITEM MEANS WITHIN THE CONTENT-MEANS AGGREGATE AND THE MEAN CONTENT-MEANS AGGREGATE SCORE FOR CONDITIONS AS THEY ARE AND CONDITIONS AS THEY SHOULD BE

	Conditions As They Are	Conditions As They Should Be
10. Your environmental education program incorporates directed learning experiences in the outdoor environment.	.75	.61
14. Teachers and/or staff members in your program employ the inquiry method as an instructional strategy in your environmental education program.	.83	.63
15. Teachers and/or staff members in your program employ values clarification strategies when dealing with the values component of environmental education.	.78	.69
16. The development of problem solving skills is emphasized in your environmental education program.	.76	.71
17. Your environmental education program encourages children to be active learners both in and out of the classroom.	.76	.56

TABLE 5

CORRELATION COEFFICIENTS MEASURING COHESIVENESS FOR INDIVIDUAL ITEM MEANS WITHIN THE CONTENT-ENDS AGGREGATE AND THE MEAN CONTENT-ENDS AGGREGATE SCORE FOR CONDITIONS AS THEY ARE AND CONDITIONS AS THEY SHOULD BE

	Conditions As They Are	Conditions As They Should Be
4. The content of your environmental education program is drawn from many disciplines, primarily the natural sciences and the social sciences.	.71	.58
5. Your environmental education program emphasizes the importance of ecologically sound human values.	.79	.67
6. Your environmental education program emphasizes the relationship between people and:		
a. The natural environment (those natural elements that exist independent of human influence).	.85	.76
b. The man-made environment (those human made structures and conditions that exist because of human influence on the environment).	.76	.72
8. Students who participate in your environmental education program gain factual knowledge about their environment.	.73	.67
13. In addition to dealing with present environmental problems, your program focuses on future environmental concerns.	.81	.68

Variable and SHOULD Variable scores for the questions listed in Table 5. Directors of established environmental education programs indicated the extent to which learning outcomes suggested by the validated criteria are presently included in their programs, as well as the extent to which these learning outcomes should be included in their program. Learning outcomes suggested by items within this aggregate pertain to the inclusion of concepts and generalizations from many disciplines; a values component; an emphasis on the relationship that exists between people and both the man-made and natural environments; and a concern for future, as well as present, environmental problems.

Program Aggregate

Correlation coefficients for the Program Aggregate are shown in Table 6. The Program Aggregate was statistically defined as the average of the mean ARE Variable and SHOULD Variable scores for items listed in Table 6. Directors of established environmental education programs reported the extent to which certain administrative factors outside the realm of the classroom are currently in evidence in their program, as well as the extent to which these administrative factors should be in evidence in their programs. Administrative factors suggested by items within this aggregate include evidence of a written statement of goals and objectives; utilization of community resources;

TABLE 6

CORRELATION COEFFICIENTS MEASURING COHESIVENESS FOR INDIVIDUAL ITEM MEANS WITHIN THE PROGRAM AGGREGATE AND THE MEAN PROGRAM AGGREGATE SCORE FOR CONDITIONS AS THEY ARE AND CONDITIONS AS THEY SHOULD BE

	Conditions As They Are	Conditions As They Should Be
7. There is a written statement of goals and objectives for your environmental education program.	.38	.47
9. Your environmental education program utilizes community resources.	.47	.49
20. The teachers who participate in your program have access to a staffed environmental education center.	.66	.66
21. Teachers who participate in your program are provided with an ongoing environmental education inservice program.	.65	.47
22. Teachers who participate in your program have completed coursework or workshops relevant to environmental education at a college or university.	.45	.46
23. Teachers who participate in your program carry special certification for environmental education on their teaching certificates.	.53	.48
24. Your State Department of Education has a State Environmental Education Master Plan setting forth goals and objectives for environmental education.	.66	.62
25. The State Environmental Education Master Plan was used in developing curriculum for your program.	.50	.58

access to a staffed environmental education center; certification and educational requirements for teachers; ongoing staff inservice; and the existence and utilization of a State Master Plan for Environmental Education.

Null Hypotheses

The final three objectives stated earlier in this chapter were structured for use with the null hypothesis. All statistical tests were performed using the Statistical Analysis System. This system was selected for the statistical testing because it was judged by a statistics specialist as the most efficient system for use with a multiple card data set. An aggregate mean and standard deviation were calculated for Conditions As They Are and Conditions As They Should Be. Individual means and standard deviations were also calculated for both the ARE Variable and SHOULD Variable components for items within each aggregate. In addition, response frequency, cumulative frequency, response percent, and cumulative percent were computed for all ARE Variable response categories and all SHOULD Variable response categories. In order to facilitate the reporting of the data analysis, the null hypotheses are stated in terms of mean aggregate scores.

The purpose of the first of the three objectives was to determine the extent to which directors of established environmental education programs perceived the validated criteria as being currently contained within the existing

conditions of their program. The null hypothesis was stated as follows:

H_o: No mean aggregate ARE Variable score will be found to be significantly less than 4 at the .05 level.

This approach assumes that if established environmental education programs currently reflect the validated criteria, then the mean aggregate ARE Variable scores will be equal to or greater than four (Condition Exists to a Large Extent). Because direction was hypothesized, a one-tailed t test was used to determine if any mean aggregate ARE Variable score was significantly less than four at the .05 level of confidence.

The purpose of the second of these objectives was to determine the extent to which directors of established environmental education programs believed the validated criteria <u>should be</u> contained within their program. The null hypothesis was stated as follows:

H_o: No mean aggregate SHOULD Variable score will be found to be significantly less than 4 at the .05 level.

Implicit within this objective is the assumption that if program directors believed that their programs should reflect the criteria validated by the jury, then they also believe the criteria to be valid and a mean aggregate SHOULD Variable score, would be equal to or greater than four (Condition Should Exist to a Large Extent). Because direction was hypothesized, a one-tailed t test was used to determine if

any mean aggregate SHOULD Variable score was significantly less than four at the .05 level of confidence.

The purpose of the third objective was to determine if differences exist between what environmental education program directors perceive to be the real status of the criteria (Conditions As They Are) and what they believe to be the ideal status of the criteria (Conditions As They Should Be). The null hypothesis for this objective was stated as follows:

> H_o: No significant difference will be found between a mean aggregate ARE Variable score and the corresponding mean aggregate SHOULD Variable score at the .05 level.

If program directors were satisfied with current conditions in their environmental education programs, then their perception of the real (ARE Variable) and their belief in what constitutes the ideal (SHOULD Variable) would be equal for a given aggregate. No direction was hypothesized, and therefore a two-tailed t test was used to determine if, at the .05 level of confidence, a mean aggregate ARE Variable score differed significantly from its corresponding mean aggregate SHOULD Variable score.

Summary

From a review of the literature, specific criteria for environmental education programs were identified and subjected to the examination and suggestion of a professional jury with expertise in environmental education. A

questionnaire was developed as a result of the jury validation and submitted to a population of established environmental education programs.

While questions in Part I of the questionnaire collected demographic data on environmental education program directors, questions from Part II were designed to measure the extent to which the validated criteria were presently embodied in established programs, as well as the extent to which it was believed the criteria should be embodied in ideal programs. To facilitate the data analysis, questions from Part II were grouped around four theoretical constructs: Time, Content-Means, Content-Ends, and Program.

The null hypotheses were designed to test the extent to which established environmental education programs presently embodied the validated criteria (Conditions As They Are); the extent to which ideal programs should embody the validated criteria (Conditions As They Should Be) and the extent to which any significant differences existed between Conditions As They Are and Conditions As They Should Be. Statistical tests were performed using the Statistical Analysis System, which was judged to be the most efficient system for data generated by this design.

CHAPTER IV

ANALYSIS OF THE DATA

Essential to the ultimate significance of any research is a clear and concise analysis of the data. In this chapter, after the specific objectives and aggregates are restated, the demographic data are presented and analyzed. In addition, findings and differences are analyzed for Conditions As They Are in environmental education programs (ARE Variables) and Conditions As They Should Be in environmental education programs (SHOULD Variables).

Specific Objectives

In an attempt to identify minimal criteria for environmental education programs, the specific objectives for this study were stated as follows:

1) To identify, through a review of the literature, a list of tentative criteria for environmental education.

2) To determine if individuals with expertise in environmental education perceive this criterion listing as valid.

3) To determine the extent to which directors of established environmental education programs perceive these criteria as being contained within their programs (Conditions As They Are).

4) To determine the extent to which directors of established environmental education programs believe

these criteria should be contained within their programs (Conditions As They Should Be).

5) To determine if differences exist between what program directors perceive to be the real status of the validated criteria in their programs (Conditions As They Are) and what they believe to be the ideal status of these criteria in their programs (Conditions As They Should Be).

Aggregates

To facilitate the analysis of data for this research, items from the questionnaire were grouped around four theoretical constructs. The title and rationale for these aggregates include the following:

1. Time - Items clustered within this aggregate are related to the student's role and participation in environmental education programs. Findings indicate if the criteria related to these items are and should be embodied in these programs, as well as when these criteria are and should be reflected in the programs. Aggregate subgroups include the Elementary, Junior High, and Senior High levels.

2. Content-Means - Items clustered within this aggregate are related to instructional strategies for environmental education programs.

3. Content-Ends - This aggregate contains items directed toward desired learning outcomes for environmental education.

4. Program - Items included here relate to administrative factors outside the realm of the classroom.

Specific items included within each aggregate are discussed in detail in the data analysis of objectives three, four, and five in this chapter.

Demographic Data

While Disinger's Projects and Programs in Environmental Education provided names of directors and brief descriptions of their programs, it provided very little information about the directors themselves. Since the survey instrument used in this research provided an excellent opportunity to gather such data, Part I of the questionnaire was designed to reveal the sex and age of the respondent; the number of years the respondent had been directly involved with environmental education; whether or not the individual had ever held a position in a public or private school and, if so, the title of that position; the academic background of the respondent; and finally, the population of the community served by their environmental education program. Analysis of the data in Part I of the survey instrument provides a profile of those individuals who have been identified as directors of existing environmental education programs throughout the United States.

Table 7 reveals data that show the sex and age of respondents.

The results show that for this population men outnumber women as directors of environmental education programs

TABLE 7

NUMBER AND PERCENT OF PROGRAM DIRECTORS REPORTING IN SEX AND AGE CATEGORIES

	Number	Percent
Sex		
Male	96	81.36
Female	22	18.64
Total	118	100.00
Age		
20 - 25	2	1.71
26 - 30	16	13.68
31 - 35	32	27.35
36 - 40	22	18.80
41 - 45	13	11.11
46 - 50	19	16.24
51 - 55	9	7.69
Over 55	4	3.42
Total	117	100.00

by a ratio slightly greater than four to one. In addition, 46.15% placed themselves between 31 and 40 years of age. The data suggest that program directors for this population are neither young nor old, ranging in age from the 20-25 age group to those exceeding 55 years of age. Response percentages show that 73.50% of the respondents stated they were between 31 and 50 years of age, 15.39% reported they were under 31 and 11.11% stated they were over fifty.

Table 8 provides data that reveals the number of years respondents have been involved with environmental education.

TABLE 8

NUMBER AND PERCENT OF PROGRAM DIRECTORS REPORTING YEARS OF INVOLVEMENT WITH ENVIRONMENTAL EDUCATION

Years	Number	Percent
1 - 2	9	7.50
3 - 4	24	20.00
5	10	8.33
6	13	10.83
7	11	9.17
8	9	7.50
9	7	5.83
10	12	10.00
11	2	1.67
12 or more	23	19.17
Total	120	100.00

The data suggest that years of experience in environmental education is fairly balanced, with the highest percentage of responses occurring at opposite ends of the spectrum. Percentages show that 27.50% of the respondents reporting involvement with environmental education had experience ranging from one to four years while 30.83% had been involved ten or more years. It is interesting to note that while the chronological age of these directors approximates a normal distribution, years of experience is skewed toward the opposite ends of the distribution.

The results in Table 9 show the frequency and percent of respondents who have held a position in a public or private school. For those reporting such experience, Table 10 contains

TABLE 9

NUMBER AND PERCENT OF PROGRAM DIRECTORS
REPORTING PUBLIC OR PRIVATE SCHOOL EXPERIENCE

School Experience	Number	Percent
Yes	74	61.67
No	46	38.33
Total	120	100.00

TABLE 10

NUMBER AND PERCENT OF PROGRAM DIRECTORS
WITH SCHOOL EXPERIENCE REPORTING
POSITION TITLE, BY CATEGORY

Position Title	Number	Percent
Environmental Education Coordinator	31	40.79
Assistant Superintendent for Curriculum and Instruction	2	2.63
District Science Education Coordinator	7	9.21
Building Principal	3	3.95
Senior High - Chairperson Science Department	5	6.58
Junior High - Chairperson Science Department	2	2.63
Classroom Teacher - Elementary	2	2.63
Classroom Teacher - Junior High	2	2.63
Classroom Teacher - Senior High	11	14.48
Other	11	14.48
Total	76	100.01

the number and percent of those holding various position titles.

The data reveal that 38.33% of the respondents had never held a position in a public or private school. Of the 61.67% that did report either present or past experience in a public or private school, 40.79% identified that position as Environmental Education Coordinator and 19.74% reported a position as a classroom teacher at the Elementary, Junior High, or Senior High level. The table also shows that 14.48% of the respondents who indicated past or present experience in public or private schools reported their position to be something other than those listed, including such titles as Resource Development Teacher; Director of Education Systems; Elementary Agriculture Coordinator; Director of School-Community Services; and Director of Thorough and Efficient Education and Supplementary Programs.

Table 11 reports the academic background of the respondents. For this item, program directors checked as many academic areas as were applicable.

As might be expected, a high majority (78.33%) listed the natural sciences as their academic background. The next most frequently cited field was social studies, which was checked by 17.50% of the respondents. It is interesting to note here, that while ideally environmental education programs are interdisciplinary in nature, a high percentage of directors in this population reported a science oriented background.

TABLE 11

NUMBER AND PERCENT OF PROGRAM DIRECTORS REPORTING VARIOUS ACADEMIC BACKGROUNDS, BY CATEGORY

Background	Number*	Percent
Social Studies	21	17.50
Natural Sciences	94	78.33
Art	2	1.67
Music	2	1.67
Vocational Education	4	3.33
Mathematics	9	7.50
English/Language Arts	8	6.67
Physical Education	3	2.50

*Can declare more than one.

The data in Table 12 reveal the populations of communities served by the environmental education programs in this population.

The data in this table include those environmental education programs that are not based in specific school systems and often identify community population in terms of larger geographic areas. These areas may range from county to multi-state populations, thus accounting in part for the 49.58% who reported programs serving communities with populations of 100,000 or more.

Findings for Objective Three

The purpose of objective three was to determine the extent to which directors of established environmental education programs perceived the validated criteria as being

TABLE 12

NUMBER AND PERCENT OF PROGRAM DIRECTORS REPORTING, BY CATEGORY, POPULATIONS OF COMMUNITIES SERVED BY THEIR ENVIRONMENTAL EDUCATION PROGRAMS

Population	Number	Percent
Less than 1,000	2	1.68
1,000 - 5,000	9	7.56
5,000 - 10,000	12	10.08
10,000 - 25,000	12	10.08
25,000 - 50,000	17	14.29
50,000 - 100,000	8	6.72
100,000 - 500,000	22	18.49
500,000 - 1,000,000	14	11.77
Greater than 1,000,000	23	19.33
Total	119	100.00

contained within their program (Conditions As They Are). The data for this objective will be reported in terms of individual items within each aggregate, as well as the mean aggregate score. Tables providing data for the mean aggregate ARE Variable scores show a varying number of responses. A mean aggregate score for Conditions As They Are was statistically defined as the average of the ARE Variable means of items within that aggregate. If a program director failed to report his perception or indicated a score of "0" (Do Not Know) for any item, then all scores for that respondent were omitted in calculating the mean aggregate score. This procedure prevented some high frequency items from affecting the mean aggregate score. The number of respondents (N) for a given aggregate is the total number of

program directors that reported their perceptions of Conditions As They Are for all items within that aggregate.

Time Aggregate

Items within the Time Aggregate are related to the participation and role of students in environmental education programs. The means and standard deviations of these items for Conditions As They Are are found in Table 13. In addition, the frequency and percent of scores for each of the response categories are reported in Table 14.

The data in Table 13 reveal that program directors perceived conditions within the Time Aggregate existing only "slightly" to "moderately" in their programs. For item one, a mean of 2.58 indicates program directors perceived slight evidence that a K-12 curriculum existed in established environmental education programs. As shown in Table 14, only 19 (16.81%) of the respondents were confident to a "large extent" that a K-12 curriculum existed in their programs.

Data for items two and three are related to the validated criterion which stated that students in an environmental education program should receive instruction as part of their regular coursework. Responses to these items indicate the extent to which program directors viewed environmental education experiences as something that was integrated into the established curriculum.

TABLE 13

MEAN SCORES AND STANDARD DEVIATIONS OF ITEMS CONTAINED WITHIN THE TIME AGGREGATE FOR CONDITIONS AS THEY ARE

	Item	N	Mean	S.D.
1.	Students in all grades, K-12, receive instruction in environmental education.	113	2.58	1.00
2.	Students who participate in your environmental education program attend a special environmental education class:			
	a. In the Elementary School	111	4.08*	1.48
	b. In the Junior High School	104	4.31*	1.37
	c. In the Senior High School	105	4.07*	1.46
3.	Students who participate in your program do not attend a special environmental education class. They receive instruction as part of their regular coursework:			
	a. In the Elementary School	91	2.97	1.09
	b. In the Junior High School	76	2.84	1.12
	c. In the Senior High School	79	2.54	1.17
11.	Students who participate in your program have meaningful input regarding the planning, implementation, and evaluation of environmental education activities:			
	a. At the Elementary level	104	2.22	1.16
	b. At the Junior High level	93	2.30	1.12
	c. At the Senior High level	96	2.68	1.27

TABLE 13 (cont'd.)

Item	N	Mean	S.D.
12. Students who participate in your environmental education program work at solving real problems in their environment rather than simulated or textbook problems:			
a. At the Elementary level	107	2.65	1.27
b. At the Junior High level	95	2.74	1.30
c. At the Senior High level	99	3.14	1.36
18. Students who participate in your environmental education program are given the opportunity to develop alternative solutions to real environmental problems, decide on a solution to the problem, act according to that decision, and evaluate the consequences:			
a. At the Elementary level	103	2.19	1.09
b. At the Junior High level	91	2.45	1.22
c. At the Senior High level	94	2.77	1.32
19. Instructional strategies in your environmental education program facilitate the development of those process skills associated with data gathering and reporting:			
a. At the Elementary level	105	2.75	1.17
b. At the Junior High level	94	2.87	1.27
c. At the Senior High level	96	3.06	1.27

*Statistically reversed.

TABLE 14

FREQUENCY AND PERCENT OF PROGRAM DIRECTORS RESPONDING TO ITEMS CONTAINED WITHIN THE TIME AGGREGATE FOR CONDITIONS AS THEY ARE

Item	Rating Scale With Percent 1	2	3	4	5
1. Students in all grades, K-12, receive instruction in environmental education.	13 11.50%	46 40.71%	35 30.97%	14 12.39%	5 4.43%
2. Students who participate in your environmental education program attend a special environmental education class:					
a. In the Elementary School	8 7.21%	12 10.81%	18 16.22%	13 11.71%	45 40.54%*
b. In the Junior High School	4 3.85%	8 7.69%	16 15.39%	22 21.15%	32 30.77%*
c. In the Senior High School	8 7.62%	8 7.62%	16 15.24%	29 27.62%	25 23.81%*
3. Students who participate in your program do not attend a special environmental education class. They receive instruction as part of their regular coursework:					
a. In the Elementary School	9 9.89%	19 20.88%	38 41.76%	16 17.58%	9 9.89%
b. In the Junior High School	9 11.84%	19 25.00%	31 40.79%	9 11.84%	8 10.53%
c. In the Senior High School	14 17.72%	31 39.24%	18 22.79%	9 11.39%	7 8.86%

TABLE 14 (cont'd.)

Item	Rating Scale With Percent 1	2	3	4	5
11. Students who participate in your program have meaningful input regarding the planning, implementation, and evaluation of environmental education activities.					
a. At the Elementary level	33	36	20	9	6
	31.73%	34.62%	19.23%	8.65%	5.77%
b. At the Junior High level	26	30	25	7	5
	27.96%	32.26%	26.88%	7.53%	5.38%
c. At the Senior High level	21	23	29	12	11
	21.88%	23.96%	30.21%	12.50%	11.46%
12. Students who participate in your environmental education program work at solving real problems in their environment rather than simulated or textbook problems:					
a. At the Elementary level	21	35	24	14	13
	19.63%	32.71%	22.43%	13.08%	12.15%
b. At the Junior High level	20	22	29	11	13
	21.05%	23.16%	30.53%	11.58%	13.68%
c. At the Senior High level	13	23	22	19	22
	13.13%	23.23%	22.22%	19.19%	22.22%

TABLE 14 (cont'd.)

Item	Rating Scale With Percent 1	2	3	4	5
18. Students who participate in your environmental education program are given the opportunity to develop alternative solutions to real environmental problems, decide on a solution to the problem, act according to that decision, and evaluate the consequences:					
a. At the Elementary level	30	42	16	11	4
	29.13%	40.78%	15.53%	10.68%	3.88%
b. At the Junior High level	25	24	25	10	7
	27.47%	26.37%	27.47%	10.99%	7.69%
c. At the Senior High level	21	23	15	27	8
	22.34%	24.47%	15.96%	28.72%	8.51%
19. Instructional strategies in your environmental education program facilitate the development of those process skills associated with data gathering and reporting:					
a. At the Elementary level	19	24	32	24	6
	18.10%	22.86%	30.48%	22.86%	5.71%
b. At the Junior High level	18	17	29	19	11
	19.15%	18.09%	30.85%	20.21%	11.70%
c. At the Senior High level	16	14	26	28	12
	16.67%	14.58%	27.08%	29.17%	12.50%

*Statistically reversed.

Rating Scale: 1 = condition does not exist; 2 = condition exists slightly; 3 = condition exists moderately; 4 = condition exists to a large extent; 5 = condition exists to a very large extent.

Because item two was stated in opposition to the criterion regarding an integrated curriculum, responses were reversed statistically to make the item compatible with the null hypothesis. As a result, interpretation of the data as they relate to the response categories was also reversed. Means for items 2a (4.08), 2b (4.31), and 2c (4.07), should be interpreted in terms of these reversals. The condition for a special environmental education class, then, exists only "slightly" at the Elementary, Junior High, and Senior High levels. It is interesting to note that this is a desired response with regard to the validated criterion. A truly integrated curricular situation precludes the notion of a special class. Table 14 shows that 18.02% at the Elementary level, 11.54% at the Junior High level, and 15.24% at the Senior High level suggested the condition of a special environmental education class existed "to a large extent."

The data reveal, however, that the same is true for students participating in environmental education experiences as part of their regular coursework. Means for item 3a (2.97), 3b (2.84), and 3c (2.54) show that an integrated environmental education curriculum was reported to exist only slightly at the Elementary, Junior High, and Senior High levels, respectively. While the figures in Table 14 suggest that a higher percentage of respondents discerned the integrated curriculum existing to a large extent, neither the integrated environmental education curriculum

nor the "special class" environmental education curriculum was viewed as the pervading approach to student participation in environmental education programs.

Item eleven asked respondents to indicate the extent to which students participating in their programs were provided with the opportunity to offer meaningful input regarding the planning, implementation, and evaluation of environmental education experiences. The data in Table 13 show a mean of 2.22 for the Elementary, 2.30 for the Junior High, and 2.68 for the Senior High demonstrating that slight support for these conditions exists at all levels. While the data in Table 14 suggest that a small percentage of program directors viewed Elementary and Junior High students as having the opportunity to provide meaningful input, nearly 25% perceived this to be the case for Senior High students. On the other hand, the data show that 31.73% at the Elementary level, 27.96% at the Junior High level, and 21.86% at the Senior High level reported that the condition did not exist in their programs.

With item twelve, program directors disclosed whether or not students in their programs were provided with the opportunity to work at solving real problems in the environment rather than simulated or textbook problems. Table 13 reveals means of 2.65 for the Elementary level, 2.74 for the Junior High level, and 3.14 for the Senior High level, suggesting that the current status of this condition is

most favorable for Senior High students. This is supported by figures in Table 14 which show that while 25.23% of the respondents at the Elementary level and 25.26% at the Junior High level indicate that this condition "exists to a large extent," 41.41% report this to be the case for students at the Senior High level. These results, while not finding a strong emphasis on providing students with the opportunity to work at solving real environmental problems, do suggest that program directors view students at the Senior High level as having a greater opportunity to be involved in such experiences.

Closely related to conditions that provide students with the opportunity to work at solving real environmental problems are those which allow students to make decisions concerning those problems. Item eighteen asked program directors if present conditions in their program allowed students to develop alternative solutions to real problems, decide on a solution, act according to that decision, and evaluate the consequences. Table 13 shows means of 2.19 for the Elementary, 2.45 for the Junior High, and 2.77 for the Senior High, indicating students at all levels have only a slight opportunity to participate in decision making activities. Data from Table 14 for this item are parallel to item twelve in that a higher percentage of program directors (37.23%) reported that students at the Senior High level have a greater opportunity to participate in

decision making activities than students at either the Elementary level (14.56%) or the Junior High level (18.68%).

Essential to problem solving and decision making is the process of gathering and reporting data. With item nineteen, program directors indicated the extent to which students in their program were provided with the opportunity to develop those process skills associated with the gathering and reporting of data. A Senior High mean of 3.06, compared with 2.75 for the Elementary and 2.87 for the Junior High, shows that a slightly greater emphasis is placed on the development of these skills for Senior High students. Percentages in Table 14 show that over 40% of the respondents reported this condition to "exist to a large extent" for Senior High students, while the same percentages for the other levels were near 30%.

Null Hypothesis - Time Aggregate

The null hypothesis for objective three was stated as follows:

> H_o: No mean aggregate ARE Variable score will be found to be significantly less than 4 at the .05 level.

Table 15 provides data for the Time Aggregate which includes an Elementary, Junior High, and Senior High subgroup. In addition, item one is included as a subheading because it provides data relevant to student participation in environmental education on a K-12 basis.

TABLE 15

MEAN AGGREGATE SCORES AND t VALUES FOR SUBGROUPS CONTAINED WITHIN THE TIME AGGREGATE FOR CONDITIONS AS THEY ARE**

Aggregate Subgroup	N	Mean	S.D.	t-Value
Item 1	113	2.58	1.00	-15.17*
Elementary level	73	2.88	0.72	-13.27*
Junior High level	66	2.98	0.80	-10.39*
Senior High level	65	3.10	0.79	- 9.15*

*Significant at .00005 level.

**In this table, and others that follow involving one-tailed t-values, the negative t-value indicates the mean value is less than the prechosen threshold of 4.0. In this instance, the finding is rejected at the .05 level of confidence. In contrast, in Table 27, the positive t-value for the item one subgroup is acceptable as a mean value at the .05 level of confidence. This interpretation is dictated by the value of the mean being greater than the prechosen threshold of 4.0.

All subgroup means are less than the ideal mean of 4 (Conditions Exist To A Large Extent), and a one-tailed t test yielded t values which show these differences to be significant. Therefore, based on the t values, the decision was made to reject the null hypothesis for all subgroups within the Time Aggregate at the .05 level of confidence.

Subgroup means provide some evidence that conditions related to student role and participation in environmental education are currently contained in established programs at all levels. In addition, only slight evidence is cited in support of a K-12 curriculum currently existing in established programs.

Content-Means Aggregate

Items within the Content-Means Aggregate pertained to instructional strategies for environmental education as validated in the criterion listing. The individual item means and standard deviations are shown in Table 16. In addition, the frequency and percent of scores for each of the response categories are reported in Table 17.

With item ten, program directors reported the extent to which directed learning experiences in the outdoors were utilized in their program. Table 16 shows a mean of 3.85 which demonstrates that program directors believe such experiences currently receive a strong emphasis. Percentages in Table 17 reveal that 65.83% of the respondents perceive this to be a condition that "exists to a large extent," while 2.50% of the directors reported that the condition did not exist in their program.

Closely related to the strategy of utilizing the outdoors for directed learning activities is that of engaging children in active learning experiences both in and out of the classroom. Data in Table 16 show item seventeen to have a mean of 4.02, which suggests that program directors view this strategy as an integral component of their programs. The results in Table 17 reveal that two respondents indicated this condition did not exist in their program, yet 70.34% reported the condition "existing to a large extent."

Item fourteen asked program directors to disclose

TABLE 16

MEAN SCORES AND STANDARD DEVIATIONS OF ITEMS CONTAINED WITHIN THE CONTENT-MEANS AGGREGATE FOR CONDITIONS AS THEY ARE

Item	N	Mean	S.D.
10. Your environmental education program incorporates directed learning experiences in the outdoor environment.	120	3.85	1.13
14. Teachers and/or staff members in your program employ the inquiry method as an instructional strategy in your environmental education program.	114	3.69	0.97
15. Teachers and/or staff members in your program employ values clarification strategies when dealing with the values component of environmental education.	105	3.08	1.03
16. The development of problem solving skills is emphasized in your environmental education program.	118	3.30	1.13
17. Your environmental education program encourages children to be active learners both in and out of the classroom.	118	4.02	0.98

TABLE 17

FREQUENCY AND PERCENT OF PROGRAM DIRECTORS RESPONDING TO ITEMS CONTAINED WITHIN THE CONTENT-MEANS AGGREGATE FOR CONDITIONS AS THEY ARE

Item	Rating Scale With Percent 1	2	3	4	5
10. Your environmental education program incorporates directed learning experiences in the outdoor environment.	3 2.50%	15 12.50%	23 19.17%	35 29.17%	44 36.67%
14. Teachers and/or staff members in your program employ the inquiry method as an instructional strategy in your environmental education program.	2 1.75%	10 8.77%	34 29.83%	43 37.72%	25 21.93%
15. Teachers and/or staff members in your program employ values clarification strategies when dealing with the values component of environmental education.	5 4.76%	26 24.76%	41 39.05%	22 20.95%	11 10.48%
16. The development of problem solving skills is emphasized in your environmental education program.	7 5.93%	20 16.95%	44 37.29%	25 21.19%	22 18.64%
17. Your environmental education program encourages children to be active learners both in and out of the classroom.	2 1.70%	5 4.24%	28 23.73%	37 31.36%	46 38.98%

Rating Scale: 1 = condition does not exist; 2 = condition exists slightly; 3 = condition exists moderately; 4 = condition exists to a large extent; 5 = condition exists to a very large extent.

the extent to which inquiry was used as an instructional strategy in their programs. Item sixteen, with a similar emphasis, asked program directors to report the same for utilization of problem solving strategies. Means of 3.69 for item fourteen and 3.30 for item sixteen disclose that program directors do see some evidence that would indicate these strategies are utilized. But while Table 17 shows nearly 60% of the respondents reporting high use of inquiry, the figure drops to slightly less than 40% for problem solving strategies.

With item fifteen, program directors provided input regarding the utilization of values clarification strategies in their programs. Table 16 shows a mean of 3.08 which indicates moderate use of these strategies. The figures in Table 17 reveal that less than one third of the respondents reported utilization of these strategies "existing to a large extent."

Null Hypothesis - Content-Means Aggregate

The null hypothesis for objective three was stated as follows:

> H_o: No mean aggregate ARE Variable score will be found to be significantly less than 4 at the .05 level.

Table 18 provides data for the Content-Means Aggregate.

An aggregate mean of 3.65 indicates that there is some evidence that instructional strategies suggested by the

TABLE 18

MEAN AGGREGATE SCORE AND t VALUE FOR THE CONTENT-MEANS AGGREGATE FOR CONDITIONS AS THEY ARE

Aggregate	N	Mean	S.D.	t Value
Content-Means	103	3.65	0.79	-4.54*

*Significant at the .00005 level.

validated criteria are being utilized in established programs. But these conditions are perceived by directors as inadequate with regard to the standards established by the validated criteria. A one-tailed t test yielded a t value of -4.54 which proves the aggregate mean to be significantly less than the ideal mean of 4 (Conditions Exist To A Large Extent). Based on the t value, the decision was made to reject the null hypothesis for the Content-Means Aggregate at the .05 level of confidence.

Content-Ends Aggregate

Items in the Content-Ends Aggregate are related to desired learning outcomes for environmental education. The means and standard deviations for these items are found in Table 19. In addition, the frequency and percent of scores for each of the response categories are shown in Table 20.

Item four asked program directors to indicate the extent to which content for their programs was drawn from

TABLE 19

MEAN SCORES AND STANDARD DEVIATIONS OF ITEMS CONTAINED WITHIN THE CONTENT-ENDS AGGREGATE FOR CONDITIONS AS THEY ARE

Item	N	Mean	S.D.
4. The content for your environmental education program is drawn from many disciplines, primarily the natural sciences and the social studies.	119	4.13	0.83
5. Your environmental education program emphasizes the importance of ecologically sound human values.	118	4.01	0.93
6. Your environmental education program emphasizes the relationship between people and:			
a. The natural environment (those natural elements that exist independent of human influence).	119	4.03	0.92
b. The man-made environment (those human made structures and conditions that exist because of human influence on the environment).	119	3.57	1.14
8. Students who participate in your environmental education program gain factual knowledge about their environment.	119	4.05	0.91
13. In addition to dealing with present environmental problems, your program focuses on future environmental concerns.	120	3.36	1.16

TABLE 20

FREQUENCY AND PERCENT OF PROGRAM DIRECTORS RESPONDING TO ITEMS CONTAINED WITHIN THE CONTENT-ENDS AGGREGATE FOR CONDITIONS AS THEY ARE

Item	Rating Scale With Percent 1	2	3	4	5
4. The content for your environmental education program is drawn from many disciplines, primarily the natural sciences and the social studies.	1 0.84%	4 3.36%	16 13.45%	55 46.22%	43 36.13%
5. Your environmental education program emphasizes the importance of ecologically sound human values.	2 1.70%	5 4.24%	23 19.49%	48 40.68%	40 33.90%
6. Your environmental education program emphasizes the relationship between people and:					
a. The natural environment (those natural elements that exist independent of human influence).	1 0.84%	7 5.88%	22 18.49%	47 39.50%	42 35.29%
b. The man-made environment (those human made structures and conditions that exist because of human influence on the environment).	4 3.36%	19 15.97%	32 26.89%	33 27.73%	31 26.05%
8. Students who participate in your environmental education program gain factual knowledge about their environment.	1 0.84%	5 4.20%	25 21.01%	44 36.98%	44 36.98%

TABLE 20 (cont'd.)

Item	Rating Scale With Percent 1	2	3	4	5
13. In addition to dealing with present environmental problems, your program focuses on future environmental concerns.	5 4.17%	27 22.50%	32 26.67%	32 26.67%	24 20.00%

Rating Scale: 1 = condition does not exist; 2 = condition exists slightly; 3 = condition exists moderately; 4 = condition exists to a large extent; 5 = condition exists to a very large extent.

many disciplines. Table 19 reveals a mean of 4.13 for this item, which suggests that program directors see their programs as currently encompassing content from many disciplines. As shown in Table 20, one respondent (0.84%) indicated that the condition did not exist, while 82.35% of the program directors reported the condition "existing to a large extent" in their programs.

Items five and eight refer to emphasis on ecologically sound human values and the acquisition of factual knowledge about the environment, respectively. Means of 4.01 for item five and 4.05 for item eight suggest that program directors view their programs as currently placing a strong emphasis in both areas. Table 20 shows that 74.57% of the directors perceived their programs emphasizing ecologically sound human values "to a large extent," while 73.95% reported the same for emphasis on the acquisition of factual knowledge about the environment.

For item six, program directors reported the extent to which their program content emphasized the relationship between people and their natural environment (6a), as well as people and their man-made environment (6b). Table 19 lists means of 4.03 for 6a and 3.57 for 6b, implying that directors view their programs as placing a greater emphasis on the natural environment relationship. The data in Table 20 show 74.79% of the directors reported programs emphasizing the natural environment "to a large extent," while 53.78%

reported the same for emphasis on the man-made environment relationship.

With item thirteen, respondents were asked to disclose the degree to which they viewed their program focusing on future, as well as present environmental concerns. A mean of 3.36 implies that directors see their programs placing moderate emphasis in this area. Table 20 shows that less than half of the respondents perceived this condition existing "to a large extent."

Null Hypothesis - Content-Ends Aggregate

The null hypothesis for objective three was stated as follows:

H_o: No mean aggregate ARE Variable score will be found to be significantly less than 4 at the .05 level of confidence.

Data for the Content-Ends Aggregate are shown in Table 21.

TABLE 21

MEAN AGGREGATE SCORE AND t VALUE FOR THE CONTENT-ENDS AGGREGATE FOR CONDITIONS AS THEY ARE

Aggregate	N	Mean	S.D.	t Value
Content-Ends	118	3.86	0.76	-1.97*

*Significant at the .025 level.

A one-tailed t test yielded a t value of -1.97, which shows the aggregate mean to be significantly less than the ideal mean of 4 (Conditions Exist To A Large Extent). Based on the t value, the decision was made to reject the null hypothesis for the Content-Ends Aggregate at the .05 level of confidence. Even though the aggregate mean is significantly less than 4 (Conditions Exist To A Large Extent), there is evidence that established environmental education programs are currently placing some emphasis on those learning outcomes suggested by the criteria.

Program Aggregate

The Program Aggregate consists of items related to administrative factors outside the realm of the classroom. The means and standard deviations for items within this aggregate are found in Table 22. In addition, the frequency and percent of scores for each of the response categories are shown in Table 23.

For item seven, program directors indicated if there were written statements of goals and objectives for their programs. Table 22 shows a mean of 3.92 for this item which suggests that established programs do have written evidence of program goals and objectives. Table 23 reveals that 69.75% of the respondents perceived this condition "existing to a large extent" in their programs.

In item nine, program directors were asked to report

TABLE 22

MEAN SCORES AND STANDARD DEVIATIONS OF ITEMS CONTAINED WITHIN THE PROGRAM AGGREGATE FOR CONDITIONS AS THEY ARE

	Item	N	Mean	S.D.
7.	There is a written statement of goals and objectives for your environmental education program.	119	3.92	1.39
9.	Your environmental education program utilizes community resources.	119	3.34	1.27
20.	The teachers who participate in your program have access to a staffed environmental education center.	108	2.91	1.60
21.	Teachers who participate in your program are provided with an ongoing environmental education inservice program.	108	2.79	1.28
22.	Teachers who participate in your program have completed coursework or workshops relevant to environmental education at a college or university.	95	2.87	1.23
23.	Teachers who participate in your program carry special certification for environmental education on their teaching certificates.	90	1.53	0.88
24.	Your State Department of Education has a State Environmental Education Master Plan setting forth goals and objectives for environmental education.	77	3.24	1.47
25.	The State Environmental Education Master Plan was used in developing curriculum for your program.	94	1.98	1.35

TABLE 23

FREQUENCY AND PERCENT OF PROGRAM DIRECTORS RESPONDING TO ITEMS CONTAINED WITHIN THE PROGRAM AGGREGATE FOR CONDITIONS AS THEY ARE

Item	Rating Scale With Percent 1	2	3	4	5
7. There is a written statement of goals and objectives for your environmental education program.	13 10.92%	9 7.56%	14 11.77%	21 17.65%	62 52.10%
9. Your environmental education program utilizes community resources.	12 10.08%	20 16.81%	28 23.53%	33 27.73%	26 21.85%
20. The teachers who participate in your program have access to a staffed environmental education center.	35 32.41%	11 10.19%	17 15.74%	19 17.59%	26 24.07%
21. Teachers who participate in your program are provided with an ongoing environmental education inservice program.	24 22.22%	19 17.59%	32 29.63%	22 20.37%	11 10.19%
22. Teachers who participate in your program have completed coursework or workshops relevant to environmental education at a college or university.	11 11.58%	31 32.63%	26 27.37%	13 13.68%	14 14.74%
23. Teachers who participate in your program carry special certification for environmental education on their teaching certificates.	58 64.44%	21 23.33%	8 8.89%	1 1.11%	2 2.22%

TABLE 23 (cont'd.)

TABLE 23 (cont'd.)

Item	Rating Scale With Percent 1	2	3	4	5
24. Your State Department of Education has a State Environmental Education Master Plan setting forth goals and objectives for environmental education.	14 18.18%	12 15.58%	13 16.88%	17 22.08%	21 27.27%
25. The State Environmental Education Plan was used in developing curriculum for your program.	54 57.45%	12 12.77%	12 12.77%	8 8.51%	8 8.51%

Rating Scale: 1 = condition does not exist; 2 = condition exists slightly; 3 = condition exists moderately; 4 = condition exists to a large extent; 5 = condition exists to a very large extent.

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the degree to which their programs currently made use of community resources. Table 23 indicates that just under 50% of the respondents reported heavy utilization of these resources. A mean of 3.34 for this item demonstrates that respondents do believe some evidence exists that their programs are utilizing resources available in the community.

Item twenty asked program directors to indicate the extent to which teachers in their program had access to a staffed environmental education center. A mean of 2.91, reported in Table 22, suggests that program directors discern little evidence that their teachers have access to such a center. Response percentages reported in Table 23 show that while 41.66% noted strong evidence for this condition, 32.41% reported no evidence of such a facility.

Items twenty-one, twenty-two, and twenty-three all relate to teacher credentials for environmental education. With item twenty-one, directors reported the extent to which teachers in their programs were provided with ongoing inservice in environmental education. A mean of 2.79 for this item suggests that directors see slight support for this condition. Item twenty-two asked directors to indicate if teachers in their program had completed university coursework or workshops relevant to environmental education. As was true for ongoing inservice, a mean of 2.87 suggests that directors discern slight evidence that their teachers have completed such training. With item twenty-three, directors

indicated the extent to which teachers in their programs carried special certification for environmental education. A mean of 1.53 reported in Table 22 discloses that directors noted little, if any, evidence for this condition. From the data provided by these items, it would seem that established environmental education programs are staffed by teachers with minimal formal preparation. In addition, there is only slight evidence that these programs are currently filling this void with ongoing inservice for teachers and staff.

Items twenty-four and twenty-five related to the existence of a State Master Plan for environmental education and its use in developing curriculum for established programs. Table 22 reveals a mean of 3.24 for item twenty-four which indicates that State Master Plans do exist. But a mean of 1.97 for item twenty-five suggests that these State plans are not being fully utilized as guides for developing environmental education curriculum. Table 23 discloses that while 49.35% reported strong evidence that a State Master Plan existed, 17.02% indicated such a plan had been important in the curriculum development process for their program.

Null Hypothesis - Program Aggregate

The null hypothesis for objective three was stated as follows:

H_o: No mean aggregate ARE Variable score will be found to be significantly less than 4 at the .05 level of confidence.

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The data for the Program aggregate are shown in Table 24.

TABLE 24

MEAN AGGREGATE SCORE AND t VALUE FOR THE PROGRAM AGGREGATE FOR CONDITIONS AS THEY ARE

Aggregate	N	Mean	S.D.	t Value
Program	61	2.96	0.69	-11.86*

*Significant at the .00005 level.

A one-tailed t test yielded a t value of -11.86, which shows the actual aggregate mean of 2.96 to be significantly less than the ideal mean of 4 (Conditions Exist To A Large Extent). Therefore, based on the t value, the decision was made to reject the null hypothesis for the Program Aggregate at the .05 level of confidence. The data in Table 24 indicate that while there is some evidence to support the existence of conditions embodied in this aggregate, it is only slight.

Findings for Objective Four

The purpose of objective four was to determine the extent to which directors of established environmental education programs believed the validated criteria should be contained in their program (Conditions As They Should Be). The data for this objective will be reported in terms of individual items within each aggregate as well as the mean

aggregate score. Tables that provide data for the mean aggregate SHOULD Variable scores show a varying number of responses. A mean aggregate score for Conditions As They Should Be was statistically defined as the average of the SHOULD Variable means of items within that aggregate. If a program director failed to report his belief or indicated a score of "0" (Do Not Know) for any item, then all scores for that respondent were omitted in calculating the mean aggregate score.

Time Aggregate

Items within the Time aggregate all related to the participation and role of students in environmental education programs. Means and standard deviations for items within the Time Aggregate are shown in Table 25. In addition, the frequency and percent of scores for each of the response categories are reported in Table 26.

Item one asked program directors to indicate the extent to which students in their programs should be provided with environmental education on a K-12 basis. A mean of 4.37 reported in Table 25 suggests that directors believe providing students with K-12 experiences is very important for environmental education programs. Response percentages in Table 26 show that 87.40% of the respondents believed this condition "should exist to a large extent."

Data for items two and three are related to the

TABLE 25

MEAN SCORES AND STANDARD DEVIATIONS OF ITEMS CONTAINED WITHIN THE TIME AGGREGATE FOR CONDITIONS AS THEY SHOULD BE

Item	N	Mean	S.D.
1. Students in all grades, K-12, receive instruction in environmental education.	119	4.38	0.81
2. Students who participate in your environmental education program attend a special environmental education class:			
a. In the Elementary School	108	2.77*	1.62
b. In the Junior High School	102	2.79*	1.66
c. In the Senior High School	104	2.61*	1.59
3. Students who participate in your program do not attend a special environmental education class. They receive instruction as part of their regular coursework.			
a. In the Elementary School	101	4.09	1.06
b. In the Junior High School	92	4.07	1.03
c. In the Senior High School	95	3.99**	1.13
11. Students who participate in your program have meaningful input regarding the planning, implementation, and evaluation of environmental education activities:			
a. At the Elementary level	111	3.28	1.05
b. At the Junior High level	101	3.50	0.94
c. At the Senior High level	104	3.76	1.02

TABLE 25 (cont'd.)

Item	N	Mean	S.D.
12. Students who participate in your environmental education program work at solving real problems in their environment rather than simulated or textbook problems:			
a. At the Elementary level	113	3.78	1.08
b. At the Junior High level	101	3.99**	0.91
c. At the Senior High level	104	4.30	0.88
18. Students who participate in your environmental education program are given the opportunity to develop alternative solutions to real environmental problems, decide on a solution to the problem, act according to that decision, and evaluate the consequences.			
a. At the Elementary level	108	3.56	1.13
b. At the Junior High level	99	3.86	1.05
c. At the Senior High level	101	4.16	1.03
19. Instructional strategies in your environmental education program facilitate the development of those process skills associated with data gathering and reporting:			
a. At the Elementary level	109	3.76	1.05
b. At the Junior High level	100	3.98**	0.98
c. At the Senior High level	102	4.11	1.01

*Statistically reversed.

**Not significantly less than 4 at the .05 level of confidence.

TABLE 26

TABLE 26

FREQUENCY AND PERCENT OF PROGRAM DIRECTORS RESPONDING TO ITEMS CONTAINED WITHIN THE TIME AGGREGATE FOR CONDITIONS AS THEY SHOULD BE

Item	Rating Scale With Percent 1	2	3	4	5
1. Students in all grades, K-12, receive instruction in environmental education.	2 1.68%	0 0.00%	13 10.92%	40 33.61%	64 53.78%
2. Students who participate in your environmental education program attend a special environmental education class:					
a. In the Elementary School	30 27.78%	29 26.85%	17 15.74%	4 3.70%	24 22.22%*
b. In the Junior High School	26 25.49%	33 32.35%	12 11.77%	5 4.90%	19 18.63%*
c. In the Senior High School	30 28.85%	35 33.65%	13 12.50%	4 3.85%	16 15.39%
3. Students who participate in your program do not attend a special environmental education class. They receive instruction as a part of their regular coursework:					
a. In the Elementary School	6 5.94%	1 0.99%	13 12.87%	39 38.61%	42 41.58%
b. In the Junior High School	5 5.44%	1 1.09%	12 13.04%	39 42.39%	35 38.04%
c. In the Senior High School	7 7.37%	2 2.11%	13 13.68%	36 37.90%	37 38.95%

TABLE 26 (cont'd.)

TABLE 26 (cont'd.)

Item	Rating Scale With Percent 1	2	3	4	5
11. Students who participate in your program have meaningful input regarding the planning, implementation, and evaluation of environmental education activities.					
a. At the Elementary level	5	20	39	33	14
	4.51%	18.02%	35.14%	29.73%	12.61%
b. At the Junior High level	2	12	35	38	14
	1.98%	11.88%	34.65%	37.62%	13.86%
c. At the Senior High level	2	9	30	34	29
	1.92%	8.65%	28.85%	32.69%	27.89%
12. Students who participate in your environmental education program work at solving real problems in their environment rather than simulated or textbook problems:					
a. At the Elementary level	3	12	27	36	35
	2.66%	10.62%	23.89%	31.86%	30.97%
b. At the Junior High level	2	3	21	43	32
	1.98%	2.97%	20.79%	42.57%	31.68%
c. At the Senior High level	2	2	11	37	52
	1.92%	1.92%	10.58%	35.58%	50.00%

TABLE 26 (cont'd.)

TABLE 26 (cont'd.)

Item	Rating Scale With Percent 1	2	3	4	5
18. Students who participate in your environmental education program are given the opportunity to develop alternative solutions to real environmental problems, decide on a solution to the problem, act according to that decision, and evaluate the consequences.					
a. At the Elementary level	6	12	30	35	25
	5.56%	11.11%	27.78%	32.41%	23.15%
b. At the Junior High level	4	6	20	39	30
	4.04%	6.06%	20.20%	39.39%	30.30%
c. At the Senior High level	3	5	13	32	48
	2.97%	4.95%	12.87%	31.68%	47.53%
19. Instructional strategies in your environmental education program facilitate the development of those process skills associated with data gathering and reporting:					
a. At the Elementary level	3	11	25	40	30
	2.75%	10.09%	22.94%	36.70%	27.52%
b. At the Junior High level	3	5	16	43	33
	3.00%	5.00%	16.00%	43.00%	33.00%
c. At the Senior High level	3	6	11	39	43
	2.94%	5.88%	10.78%	38.24%	42.16%

*Statistically reversed.

Rating Scale: 1 = condition should not exist; 2 = condition should exist slightly; 3 = condition should exist moderatley; 4 = condition should exist to a large extent; 5 = condition should exist to a very large extent.

validated criterion which stated that students in an environmental education program should receive instruction as part of their regular coursework. Responses to these items indicated the extent to which program directors believed environmental education experiences should be integrated into the established curriculum.

Because item two was stated in opposition to the criterion regarding an integrated curriculum, responses were reversed statistically to make the item compatible with the null hypothesis. As a result, interpretation of the data as they relate to the response categories was also reversed. Table 25 shows means of 2.77 for item 2a, 2.79 for 2b, and 2.61 for 2c suggesting that program directors see a special class in environmental education as very desirable at the Elementary, Junior High, and Senior High levels. One might conclude from these figures that an integrated curriculum is not considered to be important for environmental education. It is interesting to note, however, that means of 4.09 for item 3a, 4.07 for 3b, and 3.99 for 3c indicate that an integrated curriculum is also viewed as a desirable component of environmental education programs at all three levels. Response percentages in Table 26 show that 80.20% at the Elementary level, 80.43% at the Junior High level, and 76.84% at the Senior High level report a belief that environmental education should definitely be integrated into the established curriculum. This compares with 54.63% for

Elementary, 57.84% for the Junior High, and 62.50% for the Senior High who feel strongly that students should attend a special environmental education class.

With item eleven, program directors reported the extent to which students in their program should have meaningful input regarding the planning, implementation, and evaluation of environmental education activities at the Elementary, Junior High, and Senior High levels. Means of 3.28 for the Elementary, 3.49 for the Junior High, and 3.76 for the Senior High, reported in Table 25, show that there is support for such input at all three levels. Response percentages reveal that 42.34%, 51.49%, and 60.58% of the respondents believe this condition is very important at the Elementary, Junior High, and Senior High levels, while less than 5% of the respondents indicated the condition should not exist at these levels.

Item twelve asked directors if students in their programs should be allowed to work at solving real problems in their environment rather than simulated or textbook problems. Means of 3.78 at the elementary level, 3.99 at the Junior High level, and 4.30 at the Senior High level show that program directors believe this condition is more important for students at the upper levels. In support of this supposition, response percentages in Table 26 disclose that 62.83% of the directors believe this condition should "exist to a large extent" at the Elementary level, while

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74.26% and 85.58% report the same for the Junior High and Senior High levels. While the results suggest that program directors believe the opportunity to work at solving real problems in the environment is more important for upper level students, only three respondents (2.66%) believe this condition should not exist for Elementary students.

For item eighteen, program directors were asked to report the degree to which students should be provided with the opportunity to develop alternative solutions to problems, select a solution, act according to that decision, and evaluate the consequences. Table 25 reveals means of 3.56 at the Elementary level, 3.86 at the Junior High level, and 4.16 at the Senior High level. These results parallel those for working on real problems in the environment in that program directors believe decision making opportunities are more important for upper level students.

With item nineteen, program directors indicated the extent to which students in their program should have the opportunity to develop those process skills associated with data gathering and reporting. Means of 3.76 for the Elementary, 3.98 for the Junior High, and 4.11 for the Senior High show the same pattern that exists for "real world" problem solving and decision making. Program directors believe that the inclusion of conditions which allow for the development of these process skills are more important for upper level students. Response percentages reported in Table 26 reveal

that 64.22% at the Elementary, 76.00% at the Junior High, and 80.40% at the Senior High believe this condition "should exist to a large extent."

Null Hypothesis - Time Aggregate

The null hypothesis for objective four was stated as follows:

H_o: No mean aggregate SHOULD Variable score will be found to be significantly less than 4 at the .05 level of confidence.

Table 27 provides data for the Time Aggregate which includes Elementary, Junior High and Senior High subgroups. In addition, item one is listed as a subgroup because it provides data relevant to student participation in environmental education on a K-12 basis.

TABLE 27

MEAN AGGREGATE SCORES AND t VALUES FOR SUBGROUPS WITHIN THE TIME AGGREGATE FOR CONDITIONS AS THEY SHOULD BE

Aggregate Subgroup	N	Mean	S.D.	t Value
Item 1	119	4.37	0.81	5.07
Elementary level	89	3.51	0.70	-6.66*
Junior High level	83	3.70	0.63	-4.40*
Senior High level	85	3.82	0.61	-2.79**

*Significant at the .00005 level.

**Significant at the .003 level.

A mean of 4.37 for item one indicates that program directors believe a K-12 environmental education curriculum "should exist to a large extent." Because the mean for this item exceeded the ideal mean of 4 (t value = 5.07), the decision was made to accept the null hypothesis for item one. Means of 3.51 for the Elementary subgroup, 3.70 for the Junior High subgroup, and 3.82 for the Senior High subgroup are less than the ideal mean of 4 (Conditions Should Exist To A Large Extent). One-tailed t tests yielded t values which show these differences to be significant and therefore, the decision was made to reject the null hypothesis at the .05 level of confidence for the Elementary, Junior High, and Senior High subgroups contained in the Time Aggregate. Rejection of the null hypothesis for these subgroups indicates that program directors believe ideal conditions related to student role and participation in environmental education need not live up to the standards established by the validated criteria. Acceptance of the null hypothesis for item one, however, means that these directors do believe all students should be provided with a K-12 environmental education program.

Content-Means Aggregate

Items in the Content-Means Aggregate are related to desired instructional strategies for environmental education. Means and standard deviations for items within this aggregate

are shown in Table 28. In addition, the percent and frequency of scores for each of the response categories are reported in Table 29.

Item ten asked program directors to indicate the extent to which they believed their programs should utilize directed learning experiences in the outdoors. Table 28 reveals a mean of 4.33 for this item which suggests that directors believe such experiences should be an integral part of their programs. Response percentages in Table 29 show that 81.51% of the respondents expressed a belief that conditions which facilitate directed activities in the outdoor environment "should exist to a large extent."

Closely related to utilizing the outdoors for directed learning experiences, item seventeen asked program directors to report the degree to which they believed students should be engaged in active learning experiences both in and out of the classroom. Table 28 discloses a mean of 4.68 for this item, demonstrating a strong belief in employing such activities. It is interesting to note that this item has the highest mean score of any item within any aggregate for Conditions As They Should Be. Response percentages show that 97.46% of the respondents reported that this condition "should exist to a large extent."

Item fourteen asked program directors to report the extent to which they believed inquiry should be used as a strategy in their programs. Item sixteen, with a similar

TABLE 28

MEAN SCORES AND STANDARD DEVIATIONS OF ITEMS CONTAINED WITHIN THE CONTENT-MEANS AGGREGATE FOR CONDITIONS AS THEY SHOULD BE

	Item	N	Mean	S.D.
10.	Your environmental education program incorporates directed learning experiences in the outdoor environment.	119	4.33	0.88
14.	Teachers and/or staff members in your program employ the inquiry method as an instructional strategy in your environmental education program.	116	4.35	0.75
15.	Teachers and/or staff members in your program employ values clarification strategies when dealing with the values component of environmental education.	105	4.02	0.87
16.	The development of problem solving skills is emphasized in your environmental education program.	116	4.17	0.94
17.	Your environmental education program encourages children to be active learners both in and out of the classroom.	118	4.69	0.55

TABLE 29

FREQUENCY AND PERCENT OF PROGRAM DIRECTORS RESPONDING TO ITEMS CONTAINED WITHIN THE CONTENT-MEANS AGGREGATE FOR CONDITIONS AS THEY SHOULD BE

Item	Rating Scale With Percent 1	2	3	4	5
10. Your environmental education program incorporates directed learning experiences in the outdoor environment.	1 0.84%	3 2.52%	18 15.13%	31 26.05%	66 55.46%
14. Teachers and/or staff members in your program employ the inquiry method as an instructional strategy in your environmental education program.	0 0.00%	3 2.59%	10 8.62%	46 39.66%	57 49.14%
15. Teachers and/or staff members in your program employ values clarification strategies when dealing with the values component of environmental education.	1 0.95%	4 3.81%	20 19.05%	47 44.76%	33 31.43%
16. The development of problem solving skills is emphasized in your environmental education program.	2 1.72%	5 4.31%	15 12.93%	43 37.07%	51 43.97%
17. Your environmental education program encourages children to be active learners both in and out of the classroom.	0 0.00%	1 0.85%	2 1.70%	30 25.42%	85 72.03%

Rating Scale: 1 = condition should not exist; 2 = condition should exist slightly; 3 = condition should exist moderately; 4 = condition should exist to a large extent; 5 = condition should exist to a very large extent.

emphasis, sought to determine the degree to which directors believed problem solving strategies should be utilized in their programs. Means of 4.35 for inquiry strategies and 4.17 for problem solving strategies indicate that directors strongly believe both strategies should be used in their programs. Response percentages in Table 29 show that 88.79% of the respondents for inquiry and 81.04% for problem solving believe that conditions which allow for utilization of these strategies "should exist to a large extent."

For item fifteen, directors were asked to what extent values clarification strategies should be utilized in their programs. A mean of 4.02, reported in Table 28, suggests that directors believe employment of such strategies should be an integral part of their program. Response percentages in Table 29 disclose that 76.19% of the respondents support the notion that such strategies should be included in their programs.

Null Hypothesis - Content-Means Aggregate

The null hypothesis for objective four was stated as follows:

> H_o: No mean aggregate SHOULD Variable score will be found to be significantly less than 4 at the .05 level of confidence.

A one-tailed t test yielded a t value of +7.36. Because the actual mean was greater than the ideal mean of 4 (Conditions Should Exist To A Large Extent) and based on

TABLE 30

MEAN AGGREGATE SCORE AND t VALUE FOR THE CONTENT-MEANS AGGREGATE FOR CONDITIONS AS THEY SHOULD BE

Aggregate	N	Mean	S.D.	t Value
Content-Means	103	4.36	0.49	7.36

the positive t value, the decision was made to accept the null hypothesis for the Content-Means Aggregate at the .05 level of confidence. A mean of 4.36 for the Content-Means Aggregate implies that directors believe strategies embodied in this aggregate should be integral components of environmental education programs.

Content-Ends Aggregate

Items in the Content-Ends Aggregate are related to desired learning outcomes for environmental education programs. Means and standard deviations for items in this aggregate are shown in Table 31. In addition, the frequency and percent of scores for each of the response categories are reported in Table 32.

Item four asked program directors if they believed environmental education curriculum should be drawn from many disciplines. Table 31 shows a mean of 4.42 which suggests that directors believe strongly that content for their programs should include concepts and generalizations from many

TABLE 31

MEAN SCORES AND STANDARD DEVIATIONS OF ITEMS CONTAINED WITHIN THE CONTENT-ENDS AGGREGATE FOR CONDITIONS AS THEY SHOULD BE

Item	N	Mean	S.D.
4. The content for your environmental education program is drawn from many disciplines, primarily the natural sciences and the social studies.	118	4.42	0.66
5. Your environmental education program emphasizes the importance of ecologically sound human values.	116	4.63	0.54
6. Your environmental education program emphasizes the relationship between people and:			
a. The natural environment (those natural elements that exist independent of human influence).	118	4.53	0.65
b. The man-made environment (those human made structures and conditions that exist because of human influence on the environment).	118	4.34	0.81
8. Students who participate in your environmental education program gain factual knowledge about their environment.	118	4.54	0.61
13. In addition to dealing with present environmental problems, your program focuses on future environmental concerns.	119	4.33	0.79

TABLE 32

FREQUENCY AND PERCENT OF PROGRAM DIRECTORS RESPONDING TO ITEMS CONTAINED WITHIN THE CONTENT-ENDS AGGREGATE FOR CONDITIONS AS THEY SHOULD BE

Item	Rating Scale With Percent 1	2	3	4	5
4. The content for your environmental education program is drawn from many disciplines, primarily the natural sciences and the social studies.	0 0.00%	2 1.70%	5 4.24%	52 44.07%	59 50.00%
5. Your environmental education program emphasizes the importance of ecologically sound human values.	0 0.00%	0 0.00%	3 2.59%	37 31.90%	76 65.52%
6. Your environmental education program emphasizes the relationship between people and:					
a. The natural environment (those natural elements that exist independent of human influence).	0 0.00%	1 0.85%	7 5.93%	39 33.05%	71 60.17%
b. The man-made environment (those human made structures and conditions that exist because of human influence on the environment).	1 0.85%	1 0.85%	16 13.56%	39 33.05%	61 51.70%
8. Students who participate in your environmental education program gain factual knowledge about their environment.	0 0.00%	0 0.00%	7 5.93%	40 33.90%	71 60.17%

TABLE 32 (cont'd.)

Item	Rating Scale With Percent 1	2	3	4	5
13. In addition to dealing with present environmental problems, your program focuses on future environmental concerns.	0 0.00%	3 2.52%	15 12.61%	41 34.45%	60 50.42%

Rating Scale: 1 = condition should not exist; 2 = condition should exist slightly; 3 = condition should exist moderately; 4 = condition should exist to a large extent; 5 = condition should exist to a very large extent.

disciplines. Response percentages in Table 32 show that 94.07% of the directors believed this condition "should exist to a large extent" in their programs.

Items five and eight pertain to the criteria which state that established environmental education programs should emphasize ecologically sound human values and the acquisition of factual knowledge about the environment, respectively. Means of 4.63 for item five and 4.54 for item eight imply that program directors strongly believe both components should be included in their programs. Response percentages reveal that 97.41% of the program directors believe an emphasis on ecologically sound values should be an integral part of their program, while 94.07% report the same for acquisition of factual knowledge about the environment.

With item six, program directors were asked to indicate the extent to which they believed environmental education programs should emphasize the relationship between people and the natural environment (6a) as well as people and the man-made environment (6b). Means of 4.53 for the natural environment and 4.34 for the man-made environment suggest that program directors believe both components should receive major emphasis in their programs. Table 32 discloses that 93.22% of the respondents for the natural environment and 84.75% for the man-made environment reported this as their belief.

For item thirteen, program directors indicated the degree to which they believed their programs should stress future, as well as present, environmental concerns. A mean of 4.33 for this item suggests that directors strongly believe this condition should be included in their programs. Table 32 shows 84.87% of the respondents believed this condition "should exist to a large extent."

It is interesting to note that with regard to items contained in this aggregate, Table 32 shows all program directors in the population believe conditions contained in this aggregate should exist to some extent, with the exception of item 6b which referred to an emphasis on the relationship between people and their man-made environment. And here, only one respondent (0.85%) stated that this condition should not exist.

Null Hypothesis - Content-Ends Aggregate

The null hypothesis for objective four was stated as follows:

> H_o: No mean aggregate SHOULD Variable score will be found to be significantly less than 4 at the .05 level of confidence.

Table 33 provides the data for the Content-Ends Aggregate.

A one-tailed t test revealed a t value of +10.97, showing that the actual mean exceeded the ideal mean. Based on the t value, the decision was made to accept the null hypothesis for the Content-Ends Aggregate at the .05

TABLE 33

MEAN AGGREGATE SCORE AND t VALUE FOR THE CONTENT-ENDS AGGREGATE FOR CONDITIONS AS THEY SHOULD BE

Aggregate	N	Mean	S.D.	t Value
Content-Ends	116	4.47	0.46	+10.97

level of confidence. It should be noted that this aggregate showed the highest mean score of any aggregate for Conditions As They Should Be. A mean of 4.47 implies that program directors strongly believe conditions related to desired learning outcomes as validated by the criteria "should exist to a large extent" in their programs.

Program Aggregate

Items contained within this aggregate are related to administrative factors for environmental education outside the realm of the classroom. Means and standard deviations of items in this aggregate are shown in Table 34. In addition, the frequency and percent of scores for each of the response categories are reported in Table 35.

For item seven, program directors indicated to what extent they believed their programs should be able to show evidence of a written statement of goals and objectives. A mean of 4.52, shown in Table 34, implies that directors believe such a statement should be in evidence. Table 35

TABLE 34

MEAN SCORES AND STANDARD DEVIATIONS OF ITEMS CONTAINED WITHIN THE PROGRAM AGGREGATE FOR CONDITIONS AS THEY SHOULD BE

	Item	N	Mean	S.D.
7.	There is a written statement of goals and objectives for your environmental education program.	118	4.52	0.84
9.	Your environmental education program utilizes community resources.	118	4.25	1.01
20.	The teachers who participate in your program have access to a staffed environmental education center.	113	4.35	1.07
21.	Teachers who participate in your program are provided with an ongoing environmental education inservice program.	115	4.43	0.85
22.	Teachers who participate in your program have completed coursework or workshops relevant to environmental education at a college or university.	110	4.24	0.87
23.	Teachers who participate in your program carry special certification for environmental education on their teaching certificates.	106	3.16	1.30
24.	Your State Department of Education has a State Environmental Education Master Plan setting forth goals and objectives for environmental education.	103	4.39	0.78
25.	The State Environmental Education Master Plan was used in developing curriculum for your program.	98	3.47	1.29

TABLE 35

FREQUENCY AND PERCENT OF PROGRAM DIRECTORS RESPONDING TO ITEMS CONTAINED WITHIN THE PROGRAM AGGREGATE FOR CONDITIONS AS THEY SHOULD BE

Item	Rating Scale With Percent 1	2	3	4	5
7. There is a written statement of goals and objectives for your environmental education program.	2 1.70%	3 2.54%	6 5.09%	28 23.73%	79 66.95%
9. Your environmental education program utilizes community resources.	3 2.54%	6 5.09%	13 11.02%	33 27.97%	63 53.39%
20. The teachers who participate in your program have access to a staffed environmental education center.	5 4.43%	5 4.43%	6 5.31%	26 23.01%	71 62.83%
21. Teachers who participate in your program are provided with an ongoing environmental education inservice program.	3 2.61%	1 0.87%	6 5.22%	39 33.91%	66 57.39%
22. Teachers who participate in your program have completed coursework or workshops relevant to environmental education at a college or university.	2 1.82%	2 1.82%	13 11.82%	44 40.00%	49 44.55%
23. Teachers who participate in your program carry special certification for environmental education on their teaching certificate.	19 17.93%	8 7.55%	33 31.13%	29 27.36%	17 16.04%

TABLE 35 (cont'd.)

Item	Rating Scale With Percent 1	2	3	4	5
24. Your State Department of Education has a State Environmental Education Master Plan setting forth goals and objectives for environmental education.	0 0.00%	2 1.94%	13 12.62%	31 30.10%	57 55.34%
25. The State Environmental Education Master Plan was used in developing curriculum for your program.	13 13.27%	5 5.10%	27 27.55%	29 29.59%	24 24.49%

Rating Scale: 1 = condition should not exist; 2 = condition should exist slightly; 3 = condition should exist moderately; 4 = condition should exist to a large extent; 5 = condition should exist to a very large extent.

reveals that 90.68% of the respondents feel that this condition "should exist to a large extent" in their programs.

With item nine, program directors were asked to report the degree to which they believed their programs should be utilizing community resources. Response percentages show that over 80% of the respondents strongly believe their programs should be making use of these resources. A mean of 4.25, reported in Table 34, implies that directors believe that utilization of resources available in the community should be an important aspect of their programs.

Item twenty asked program directors to indicate their belief with regard to conditions which would provide teachers with access to a staffed environmental education center. A mean of 4.35 implies that directors believe teachers should have access to such a center. Response percentages in Table 35 reveal that 85.84% of the respondents believe this condition "should exist to a large extent" in their programs.

Items twenty-one, twenty-two, and twenty-three relate to teacher credentials for environmental education. With item twenty-one, program directors reported to what extent teachers in their program should be provided with an ongoing inservice program. A mean of 4.42, reported in Table 34, implies that there is a strong conviction for providing teachers with such a program. For item twenty-two, directors reported the extent to which they believe

their teachers should complete university coursework or workshops pertinent to environmental education. Again, a mean of 4.24 suggests that directors strongly believe this condition to be important for teachers in their program. With item twenty-three, however, a mean of 3.16 shows that there is less conviction with regard to requiring teachers to carry special environmental education certification on their teaching certificates. Table 35 shows 43.40% of the directors believe this condition to be important, compared with 91.30% for ongoing inservice and 84.55% for completion of coursework or workshops. The findings for these items imply that while program directors believe preservice and inservice opportunities for teachers are important, there is less support for a formal certification requirement.

Items twenty-four and twenty-five asked program directors if they believed their state should provide a Master Plan for environmental education and to what extent such a plan should be used in developing curriculum for their programs. A mean of 4.39 for item twenty-four shows that respondents strongly believe their states should have such a plan available. However, a mean of 3.47 for item twenty-five implies that program directors are less supportive with regard to using such a plan when developing curriculum for their programs.

Null Hypothesis - Program Aggregate

The null hypothesis for objective four was stated as follows:

H_o: No mean aggregate SHOULD Variable score will be found to be significantly less than 4 at the .05 level of confidence.

TABLE 36

MEAN AGGREGATE SCORE AND t VALUE FOR THE PROGRAM AGGREGATE FOR CONDITIONS AS THEY SHOULD BE

Aggregate	N	Mean	S.D.	t Value
Program	84	4.13	0.50	2.48

A mean of 4.13 for this aggregate implies program directors believe conditions related to administrative factors suggested by the validated criteria should be included in environmental education programs. A one-tailed t test yielded a t value of +2.48, indicating the actual mean to be greater than the ideal mean of 4 (Conditions Should Exist To A Large Extent). Based on the positive t value, the decision was made to accept the null hypothesis for the Program Aggregate at the .05 level of confidence.

Findings for Objective Five

The purpose of objective five was to determine if differences exist between what program directors perceive to be the real status of the validated criteria in their

programs (Conditions As They Are) and what they believe to be the ideal status of these criteria in their programs (Conditions As They Should Be). The null hypothesis for this objective was stated as follows:

> H_o: There will be no significant difference at the .05 level between a mean aggregate ARE Variable score and the corresponding mean aggregate SHOULD Variable score.

It was assumed that if program directors were satisfied with their environmental education programs, then for a given aggregate, their perception of the real (ARE Variables) and their belief in what constitutes the ideal (SHOULD Variables) would be equal. No direction was hypothesized and therefore a two-tailed t test was used to determine if a significant difference existed.

The data for objective five will be reported in terms of differences between a mean aggregate ARE Variable score and its corresponding mean aggregate SHOULD Variable score. In all cases, the difference was determined by subtracting the mean ARE Variable score from its corresponding mean SHOULD Variable score. Therefore, a positive mean difference implies that the mean SHOULD Variable score was the greater of the two. In addition, difference was calculated for an item only if the respondent recorded a score for both Conditions As They Are and Conditions As They Should Be. If a respondent omitted a score or recorded a "0" (Do Not Know) for either the ARE Variable or SHOULD

Variable, for any item within a given aggregate, then all scores within that aggregate for that respondent were omitted in calculating the mean difference score. These missing values account for the varying number of respondents (N) within and between aggregates.

Time Aggregate

The data for the Time Aggregate are provided in Table 37.

TABLE 37

MEAN DIFFERENCES BETWEEN CONDITIONS AS THEY ARE AND CONDITIONS AS THEY SHOULD BE, AND t VALUES, FOR SUBGROUPS WITHIN THE TIME AGGREGATE

Aggregate Subgroup	N	Mean Difference	t Value
Item 1	113	1.82	18.69*
Elementary level	71	0.73	11.10*
Junior High level	65	0.81	10.38*
Senior High level	64	0.79	9.43*

*Significant at the .0001 level.

Conditions reflected in the Time Aggregate are related to the student's role and participation in environmental education programs and include the following:

1) Student participation in an integrated environmental education curriculum.

2) Student input regarding the planning, implementation, and evaluation of environmental education activities.

3) Student participation with regard to solving real problems in the environment, rather than simulated or textbook problems.

4) Student participation in the decision making process as it relates to problem solving.

5) Student participation in activities that facilitate the development of those process skills associated with data gathering and reporting.

A two-tailed t test yielded t values of 18.69 for item one, 11.10 for conditions at the Elementary level, 10.38 for conditions at the Junior High level, and 9.43 for conditions at the Senior High level indicating that differences between Conditions As They Are and Conditions As They Should Be are statistically significant at the .0001 level. Therefore, based on the t values, the decision was made to reject the null hypothesis for all subgroups in the Time Aggregate at the .05 level of confidence.

Table 37 reveals mean differences of 0.73 at the Elementary level, 0.80 at the Junior High level, and 0.79 at the Senior High level which suggests that program directors believe that conditions related to the student's role and participation in environmental education programs at all levels should exist to a greater extent than they do at the present time at all levels.

Item one is included as a subgroup within this aggregate because it provides information concerning student participation in environmental education on a K-12 basis. A mean difference of 1.82 between Conditions As They Are

and Conditions As They Should Be for this item implies that program directors believe that K-12 environmental education programs should be in much greater evidence.

Content-Means Aggregate

Table 38 provides data for the Content-Means Aggregate.

TABLE 38

MEAN DIFFERENCES BETWEEN CONDITIONS AS THEY ARE AND CONDITIONS AS THEY SHOULD BE, AND t VALUES, FOR THE CONTENT-MEANS AGGREGATE

Aggregate	N	Mean Difference	t Value
Content-Means	101	0.71	10.79*

*Significant at the .0001 level.

Conditions contained in the Content-Means Aggregate are related to instructional strategies for environmental education programs and include the following:

1) Utilization of the outdoor environment for directed learning experiences.
2) Utilization of the inquiry method.
3) Use of values clarification.
4) Use of problem solving strategies.
5) Utilization of strategies that encourage children to be active learners both in and out of the classroom.

A two-tailed t test yielded a t value of 10.79,

indicating that the mean difference between Conditions As They Are and Conditions As They Should Be for the Content-Means Aggregate is significant at the .0001 level. Therefore, based on the t value, the decision was made to reject the null hypothesis for the Content-Means Aggregate at the .05 level of confidence.

A mean difference of 0.71 between Conditions As They Are and Conditions As They Should Be for this aggregate implies that program directors believe these strategies should be used to a greater extent than they are at the present time.

Content-Ends Aggregate

Table 39 provides data for the Content-Ends Aggregate.

TABLE 39

MEAN DIFFERENCES BETWEEN CONDITIONS AS THEY ARE AND CONDITIONS AS THEY SHOULD BE, AND t VALUES, FOR THE CONTENT-ENDS AGGREGATE

Aggregate	N	Mean Difference	t Value
Content-Ends	116	0.61	10.46*

*Significant at the .0001 level.

Conditions embodied in the Content-Ends Aggregate are related to desired learning outcomes for environmental education programs and include the following:

1) An emphasis on drawing content for environmental education from many disciplines, primarily the natural and social sciences;

2) An emphasis on ecologically sound human values;

3) An emphasis on the relationship that exists between people and their natural as well as their man-made environments;

4) An emphasis on the acquisition of factual knowledge about the environment;

5) An emphasis on future as well as present environmental concerns.

A two-tailed t test yielded a t value of 10.46 which demonstrates that the mean difference between Conditions As They Are and Conditions As They Should Be is statistically significant at the .0001 level. Therefore, based on the t value, the decision was made to reject the null hypothesis for the Content-Ends Aggregate at the .05 level of confidence.

A mean difference of 0.61 between Conditions As They Are and Conditions As They Should Be suggests that program directors believe desired learning outcomes implicit in these conditions should be in greater evidence in environmental education programs than they are at the present time. It is interesting to note, however, that the mean difference score for the Content-Ends Aggregate is the smallest of any aggregate, indicating that current conditions come close to meeting the standards established by the criteria.

Program Aggregate

The data for the Program Aggregate is provided in Table 40

TABLE 40

MEAN DIFFERENCES BETWEEN CONDITIONS AS THEY ARE AND CONDITIONS AS THEY SHOULD BE, AND t VALUES, FOR THE PROGRAM AGGREGATE

Aggregate	N	Mean Difference	t Value
Program	58	1.26	13.91*

*Significant at the .0001 level.

Conditions contained in the Program Aggregate are related to administrative factors for environmental education outside the realm of the classroom and include the following:

1) Evidence of a written statement of goals and objectives for environmental education programs;

2) Evidence of utilization of community resources;

3) Access for teachers to a staffed environmental education center;

4) Evidence of an ongoing environmental education inservice program for teachers;

5) Evidence that teachers have completed university coursework or workshops in environmental education;

6) Evidence of special environmental education certification for teachers;

7) Evidence of a State Master Plan that sets forth statewide goals and objectives for environmental education;

8) Provision for utilization of a State Master Plan in developing environmental education curriculum.

A two-tailed t test yielded a t value of 13.91 which proves that the mean difference between Conditions As They Are and Conditions As They Should Be is statistically significant at the .0001 level. Therefore, based on the t value, the decision was made to reject the null hypothesis at the .05 level of confidence.

Table 40 shows a mean difference of 1.26 between Conditions As They Are and Conditions As They Should Be which indicates that program directors believe administrative factors reflected in these conditions should exist to a greater extent than they do at the present time.

Summary

Findings for Objective Three

The null hypothesis was rejected for all aggregates for Conditions As They Are which suggests program directors perceived only slight support for the contention that conditions suggested by these items presently existed in their programs. For the Time Aggregate, rejection of the null hypothesis implies that student participation in environmental education is limited with regard to an integrated, K-12 curriculum design; meaningful input regarding planning, implementation, and evaluation; participation in "real world" problem solving and decision making; and the opportunity to develop those process skills associated with data

gathering and reporting. While the data show that older students have a slightly greater opportunity to participate in such activities, the findings show only slight support at the Elementary, Junior High and Senior High levels.

Rejection of the null hypothesis for the Content-Means Aggregate suggests that teaching strategies for environmental education, as validated in the criterion listing, are not currently an integral component of established programs. Only moderate support was reported by directors regarding the utilization of directed outdoor learning experiences, inquiry, values clarification, and problem solving strategies in their programs. Program directors did indicate stronger support, however, that conditions currently embodied in their programs encouraged students to be active learners, both in and out of the classroom (Mean = 4.02).

For the Content-Ends Aggregate, rejection of the null hypothesis implies that desired learning outcomes for environmental education programs are not currently being realized. It is interesting to note, however, that program directors strongly support the notion that their programs currently provide a major emphasis on an interdisciplinary framework (Mean = 4.13), ecologically sound human values (Mean = 4.01), the relationship between man and his natural environment (Mean = 4.03), and the acquisition of factual knowledge about the environment (Mean = 4.05). Directors reported only moderate support for the contention that their

programs currently emphasized future environmental concerns and the relationship that exists between people and their man-made environment. Even though the null hypothesis was rejected for the Content-Ends Aggregate (Aggregate Mean = 3.86), it should be noted that program directors view their programs as currently providing a major emphasis on four of the six criteria contained within this aggregate.

Rejection of the null hypothesis for the Program Aggregate indicates that directors see only slight evidence that conditions relating to administrative factors outside the realm of the classroom presently exist in their programs. Program directors reported some support relevant to the existence of a written statement of program goals and objectives, access to a staffed environmental education center, utilization of community resources, preservice and inservice opportunities for teachers, and the existence of a State Master Plan for Environmental Education. There was virtually no support, however, for teachers presently carrying special environmental education certification on their teaching certificates or utilization of the State Master Plan for curriculum development.

Findings for Objective Four

In general, program directors were more supportive with regard to the ideal status of the criteria in their program. For the Time Aggregate, however, the null

hypothesis was rejected for the Elementary, Junior High, and Senior High subgroups. This leaves open the question that even under ideal conditions, student participation in environmental education should be limited with regard to an integrated curriculum; meaningful input related to the planning, implementation, and evaluation of activities; "real world" problem solving and decision making; and opportunities that facilitate the development of data gathering and reporting skills. Program directors do believe increased opportunities pertaining to these conditions should exist for Junior High and Senior High students, but this belief lessens for Elementary students. In addition, seemingly contradictory results were reported for an integrated curriculum. Program directors reported a strong belief that students at all levels should attend a special environmental education class and students at all levels should receive instruction as part of their regular coursework. The findings imply that these conditions should be viewed as complimentary rather than mutually exclusive.

The null hypothesis was accepted for the subheading in the Time Aggregate which stated that students should participate in environmental education on a K-12 basis, suggesting that directors strongly believe this condition should be an integral component of their programs.

Acceptance of the null hypothesis for the Content-Means Aggregate implies that directors believe their

programs should utilize those instructional strategies validated in the criterion listing. Program directors strongly support the belief that teachers in their programs should employ directed outdoor learning experiences, inquiry, values clarification, and problem solving strategies. In addition, directors showed major support for conditions which would encourage students to be active learners both in and out of the classroom (Mean = 4.69).

The null hypothesis was accepted for the Content-Ends Aggregate, which suggests that program directors strongly believe their programs should emphasize those learning outcomes validated in the criterion listing. Directors reported that their programs should emphasize an interdisciplinary curriculum, ecologically sound human values, the relationship between people and their natural environment as well as their man-made environment, acquisition of factual knowledge, and concern for future environmental problems.

Acceptance of the null hypothesis for the Program Aggregate indicates that program directors believe conditions related to administrative factors for environmental education, outside the realm of the classroom, should be highly visible in their programs. Program directors reported strong beliefs regarding evidence of a written statement of goals and objectives, evidence of a State Master Plan for Environmental Education, and utilization of community

resources. In addition, it was reported that directors believe their programs should make provision for inservice and preservice opportunities as well as access to a staffed environmental education center. Less support was in evidence, however, regarding special certification for environmental education (Mean = 3.16) and utilization of the State Master Plan for curriculum development (Mean = 3.47). It is interesting to note that while program directors strongly believe the state should provide a master plan for environmental education (Mean = 4.39), there is considerably less support regarding the use of such a plan for curriculum development (Mean = 3.47).

Findings for Differences between Conditions As They Are and Conditions As They Should Be

Rejection of the null hypothesis for all aggregates indicates a significant difference existed between Conditions As They Are and Conditions As They Should Be in established environmental education programs regarding student role and participation, instructional strategies, desired learning outcomes, and administrative factors outside the realm of the classroom. The results show that for all aggregates, program directors believed that all conditions should ideally exist to a greater extent than they do at the present time. These findings imply that program directors are not satisfied with their program's performance

as it relates to the validated criteria. Analysis of the data reveals that program directors perceive the real status of the criteria in their programs as falling significantly short of what they believe the ideal status should be.

CHAPTER V

SUMMARY, CONCLUSIONS, IMPLICATIONS AND RECOMMENDATIONS

The data resulting from any research achieves some of its greatest value when viewed with regard to contributions and implications for the profession. In this final chapter, the problem and methodology are reviewed briefly while the findings for the sections Conditions As They Are and Conditions As They Should Be are reported as well as the summary of their perceived differences. In addition, there are recommendations for the future development of environmental education programs and suggestions for related research in the field.

Summary

Problem

In recent years, environmental education has become a primary concern of professional educators. Experts from universities, public school systems, governmental agencies, and society at large are calling for schools to design and implement environmental education programs. But those who would design curriculum for such programs are hindered by a number of obstacles. At the present time, for example, a

nationally accepted definition of environmental education does not exist, nor are there minimal criteria for the purpose of planning, implementing, and evaluating programs.

In an attempt to reduce some of the ambiguity associated with environmental education, this study concerned itself with the identification and validation of criteria for environmental education programs. In addition, the research sought:

1) to determine the extent to which directors of established programs perceived these criteria as being contained within their programs (Conditions As They Are);

2) to determine the extent to which directors of established programs believed these criteria should be contained within their programs (Conditions As They Should Be);

3) to determine if differences existed between what program directors perceive to be the real status of the validated criteria in their programs (Conditions As They Are), and what they believe to be the ideal status of these criteria in their programs (Conditions As They Should Be).

Procedure

As a result of the review of the literature, a tentative criterion listing for environmental education was developed and mailed to a national jury with recognized expertise in the field. Following the validation, a survey instrument was designed for the purpose of collecting data from directors of established environmental education programs. The instrument, along with a cover letter and instructions was mailed to a population of 137 environmental

education program directors. High interest in the study could be measured by the return of 120 responses in time to be used in the final compilation.

In order to facilitate data analysis, items from the questionnaire were grouped around four theoretical constructs--Time, Content-Means, Content-Ends, and Program. Null hypotheses were stated in terms of these aggregates and data were analyzed by aggregate for the sections Conditions As They Are and Conditions As They Should Be. Means, standard deviations, response frequencies, and response percentages were computed for individual questionnaire items. In addition, one-tailed and two-tailed t tests were used to analyze the aggregate data.

Findings for Conditions As They Are

The null hypothesis was rejected for all aggregates for the section Conditions As They Are which suggests program directors perceived only slight support for the contention that conditions suggested by these items presently exist in their programs. For the Time Aggregate, rejection of the null hypothesis implies that student participation in environmental education is limited pertaining to an integrated K-12 curriculum design; meaningful input regarding planning, implementation, and evaluation; participation in "real world" problem solving and decision making; and the opportunity to develop those process skills associated with

data gathering and reporting. While the data show that older students have a somewhat greater opportunity to participate in such activities, the overall findings suggest only slight support that these conditions are currently contained at the Elementary, Junior High and Senior High levels.

Rejection of the null hypothesis for the Content-Means Aggregate section suggests that teaching strategies for environmental education, as validated in the criterion listing, are not currently an integral component of established programs. Only moderate support was reported by directors regarding the utilization of directed outdoor learning experiences, inquiry, values clarification, and problem solving strategies in their programs. However, program directors strongly supported those strategies currently embodied in their programs which encouraged students to be active learners, both in and out of the classroom.

For the Content-Ends Aggregate section, rejection of the null hypothesis implies that desired learning outcomes for environmental education programs are not currently being realized. It is interesting to note, however, that program directors strongly support the notion that their programs currently provide a major emphasis on an interdisciplinary framework, ecologically sound human values, the relationship between man and his <u>natural</u> environment,

and the acquisition of factual knowledge about the environment. Directors reported only moderate support for the contention that their programs currently emphasized future environmental concerns and the relationship that exists between people and their man-made environment. Even though the null hypothesis was rejected for the Content-Ends Aggregate, it is noted that program directors view their programs as currently providing a major emphasis on four of the six criteria contained within this aggregate.

Rejection of the null hypothesis for the Program Aggregate section indicates that directors see only slight evidence that conditions relating to administrative factors outside the realm of the classroom presently exist in their programs. Program directors reported some support relevant to the existence of a written statement of program goals and objectives, access to a staffed environmental education center, utilization of community resources, preservice and inservice opportunities for teachers, and the existence of a State Master Plan for Environmental Education. There was virtually no support, however, for teachers presently carrying special environmental education certification on their teaching certificates or utilization of the State Master Plan for curriculum development.

Findings for Conditions As They Should Be

In general, program directors were more supportive of the criteria with regard to their ideal status in programs. For the Time Aggregate, however, the null hypothesis was rejected for the Elementary, Junior High, and Senior High subgroups, which suggests that even under ideal conditions, student participation in environmental education should be limited with regard to an integrated curriculum; meaningful input related to the planning, implementation, and evaluation of activities; "real world" problem solving and decision making; and opportunities that facilitate the development of data gathering and reporting skills. Program directors strongly believe increased opportunities pertaining to these conditions should exist for Junior High and Senior High students, but this belief lessens for Elementary students. In addition, seemingly contradictory results were reported for an integrated curriculum. Program directors reported a strong belief that students at all levels should attend a special environmental education class and students at all levels should receive instruction as part of their regular coursework. These findings might well imply that these two conditions should be viewed as complimentary rather than mutually exclusive.

The null hypothesis was accepted for the subheading in the Time Aggregate section which stated that students

should participate in environmental education on a K-12 basis, suggesting that directors strongly believe all students in their program should be involved in some facet of environmental education.

Acceptance of the null hypothesis for the Content-Means Aggregate section implies that directors believe their programs should utilize those instructional strategies validated in the criterion listing. Program directors strongly support the belief that teachers in their programs should employ directed outdoor learning experiences, inquiry, values clarification, and problem solving strategies. In addition, directors showed major support for conditions which would encourage students to be active learners both in and out of the classroom.

The null hypothesis was accepted for the Content-Ends Aggregate section, suggesting that program directors strongly believe that their programs should emphasize those learning outcomes validated in the criterion listing, including an interdisciplinary curriculum, ecologically sound human values, relationships between people and their natural environment as well as their man-made environment, acquisition of factual knowledge and concern for future environmental problems.

Acceptance of the null hypothesis for the Program Aggregate section indicates that program directors believe conditions related to administrative factors for

environmental education outside of the realm of the classroom should be highly visible in their programs. Program directors reported strong beliefs for a written statement of goals and objectives, evidence of a State Master Plan for Environmental Education, and utilization of community resources. In addition, directors believe their programs should make provision for inservice and preservice opportunities as well as access to a staffed environmental education center. Less support was in evidence, however, regarding special certification for environmental education and utilization of the State Master Plan for curriculum development. It should be noted that while program directors strongly believe the state should provide a master plan for environmental education, there is considerably less support regarding the use of such a plan for curriculum development.

Findings for Differences between Conditions As They Are and Conditions As They Should Be

Rejection of the null hypothesis for all aggregates indicates a significant difference existed between the sections Conditions As They Are and Conditions As They Should Be in established environmental education programs regarding student role and participation, instructional strategies, desired learning outcomes, and administrative factors outside the realm of the classroom. The results

show that program directors believe students should be provided with increased opportunities to participate in environmental education programs. In addition, programs should provide a greater emphasis on those instructional strategies, learning outcomes, and administrative factors related to the criteria than they do at the present time. These findings imply that directors are not satisfied with their programs' performance as they relate to the validated criteria. Analysis of the data reveals that directors perceive the real status of the criteria in their programs as falling significantly short of what they believe should be the ideal status.

Summary

1. Directors of established environmental education programs report some evidence that the validated criteria are currently included in their programs.

2. Program directors report greater support for criteria related to instructional strategies and desired learning outcomes than those criteria related to student participation and administrative factors outside the realm of the classroom.

3. Directors strongly believe that criteria related to instructional strategies, desired learning outcomes, and administrative factors should be in evidence under ideal conditions.

4. Program directors believe environmental education criteria related to student role and participation are more important for students at the Junior High and Senior High levels.

5. Directors believe that conditions reflecting the validated criteria should exist to a greater extent in their programs than they do at the present time.

Conclusions

The findings for the section Conditions As They Are support the general conclusion that while there is some evidence that the criteria are contained in established environmental education programs, the emphasis afforded to them is not extensive. It is evident that a gulf exists between the theory of environmental education as expressed in the professional literature and the current teaching of environmental education. This discrepancy suggests that established programs should be reviewed with regard to the validated criterion listing, a contention further supported by results from the section Conditions As They Should Be. Directors of established programs report strong beliefs that the criteria related to instructional strategies, desired learning outcomes, and administrative factors outside the realm of the classroom should be contained in their programs. These findings imply that program directors view the criteria as valid and believe that their programs should be upgraded

to meet such standards. Furthermore, mean differences between the sections Conditions As They Are and Conditions As They Should Be show that program directors believe all of the criteria should be included in their programs to a greater extent than they are at the present time.

Criteria contained within the Time Aggregate section are related to student roles and participation in environmental education. Results for this aggregate suggest that current programs for Senior High students come closest to reflecting the validated criteria, while present conditions for Elementary students are more remote from the desired criteria. In addition, results also show that for the section Conditions As They Should Be, the criteria should favor older students. This implies that Junior High and Senior High students are perceived as more capable and better able to handle the challenge and responsibility inherent in "real world" problem solving and decision making, meaningful input with regard to instruction, and development of data gathering and reporting skills. It would seem that it is not the criteria that program directors question, but rather at what level they become important for environmental education programs.

It is noted that for the section Conditions As They Should Be, program directors indicated strong support for an integrated curriculum as well as having students at all levels attend a special environmental education class. It

would appear that program directors did not perceive these conditions as mutually exclusive, but rather as curricular alternatives, both capable of enhancing the program. Based on the practitioners' view, it might be well to strive for an integrated curricular design, but at the same time offer classes where the primary focus is upon environmental education.

For current conditions, program directors perceive their programs to be strongest when compared to criteria related to desired learning outcomes. This implies that curriculum in established programs is presently characterized by an emphasis on content from many disciplines, ecologically sound values, and the relationship between people and their natural as well as man-made environments. In addition, acquisition of knowledge, and a concern with future as well as present environmental concerns is evident in these programs. But even though the current emphasis can be viewed as adequate, program directors believe these favored criteria should receive an even stronger emphasis.

Strong support is given to emphasis on the relationship between people and their man-made environment since environmental education is often viewed as encompassing only aspects of the natural environment. By indicating such a strong support, program directors broaden the parameters of environmental education to include social as well as scientific concerns. Implicit in this support is the

notion that curriculum should be designed to provide learning experiences relevant to all elements of the environment, not just that component associated with nature. Environmentally literate citizens, for example, must be as concerned with the problems of cities as they are with endangered species and polluted rivers.

Program directors report some support for the contention that instructional strategies posited by the criteria are currently being used by teachers. These strategies include utilization of directed outdoor learning experiences, inquiry, values clarification, problem solving, and "hands on" experiences. For the section Conditions As They Should Be, however, directors reported that teachers in their programs should be emphasizing these strategies to an even greater extent than they are at the present time. These findings imply that teachers of environmental education currently lack the motivation or training to utilize these instructional strategies to the degree that program directors desire. If teachers are unprepared to use the methodologies implicit in the criteria, then staff development through increased inservice opportunities should be a prime concern for program development. In addition, teacher education institutions must play an increasingly active role in the preparation of teachers who are motivated as well as competent with regard to implementing these instructional strategies.

It is interesting to note that program directors see both inservice and preservice opportunities as conditions which should be more heavily emphasized than they are at the present time. There is also some director support for requiring official certification for teachers in the area of environmental education. While the scope of such support would not seem to be extensive at this time, such a requirement would encourage major change in teacher preparation institutions. The funding of additional courses to meet these requirements in itself would incur a heavy burden upon most institutions of higher education.

Results related to criteria dealing with administrative factors for environmental education outside the realm of the classroom lead to the conclusion that while there is some evidence that these criteria are currently contained in established programs, their inclusion cannot be assumed to be universal. Specific administrative factors embodied in the recommended criteria for environmental education programs include:

1) a written statement of goals and objectives;
2) utilization of community resources;
3) access to a staffed environmental education center;
4) ongoing inservice opportunities;
5) evidence of completed university coursework or workshops in environmental education;
6) special environmental education certification for teachers;

7) the existence of a State Environmental Education Master Plan;

8) the utilization of such a plan for developing environmental education curriculum.

The results show that although program directors strongly believe the state should provide a Master Plan for environmental education, there is weaker support for utilizing such a plan to develop program curriculum. Based on these findings, a successful means for developing such a plan is somewhat clouded. It would seem that one of the primary purposes of a state plan would be to facilitate the development of environmental education curriculum on a local basis. But if this tool is to be useful in the curriculum development process, schools must view it as a facilitative effort and not as an absolute model that prohibits unique community needs.

Also of interest is the belief that the utilization of community resources should be an integral component of environmental education programs. If an emphasis is to be placed on the relationship between people and their man-made environment, then the man-made environment must be included within the framework of the program's offerings. For this to happen, the traditional barrier that exists between school and community will have to be surmounted so that meaningful instruction can occur in the community as well as within the confines of the classroom.

A final conclusion drawn from this research relates

to the general validity of the criteria. Initially, the criteria were judged to be valid by a nationally select group of individuals with expertise in environmental education. In addition, practitioners in the field have effectively judged the criteria as valid by reporting strong support for including them in environmental education programs. This implies that program directors view the criteria as realistic standards by which environmental education curriculum can be planned, implemented, and evaluated. The criterion listing, it would seem, was perceived as a feasible blend of the theory of environmental education present in the professional literature with the practice of environmental education in established nationwide programs.

Recommendations

The following recommendations, related to this study, are suggested for the improvement of environmental education.

1. The criteria are recommended to public or private school systems with established environmental education programs as a means by which present program offerings can be evaluated. It is believed that the results of such an evaluation will aid curriculum planners in improving instructional experiences for students in their program.

2. In addition, the criteria can serve as a guide

for individuals within a school system, or other institution, who wish to plan and implement an environmental education program where one does not presently exist. To this end, the criteria should provide a needed foundation for conducting a needs assessment as well as for the more obvious planning of curricular experiences.

3. The criteria can be used by teachers of environmental education to improve the quality of their instruction, or, where a formal program is lacking, to provide guidance for developing environmental education experiences within the classroom.

4. It is also believed that the criteria can serve as a guide for preparing teachers for environmental education programs through university coursework, workshops, or inservice education programs. The validity of the criteria in relating to instructional strategies and desired learning outcomes lends credence to this recommendation in that directors of established programs view those competencies embodied in these criteria as desirable for ideal programs.

5. The criteria are also recommended to environmental education program personnel outside the realm of public or private schools, as a means of evaluating and upgrading the quality of their programs. If such programs are to compliment school based offerings, then it is crucial that both strive to achieve the same quality of student participation and ultimate goals.

Educators should also be made aware of the following recommendations which are implicit from the findings of the study.

1. If formal education is to meet the challenge of solving future, as well as present environmental problems, then schools must assume a portion of the responsibility for producing an environmentally literate citizenry. To this end, present environmental education programs must be continued and expanded. Moreover, it is obvious that where programs do not presently exist, new ones must be established without delay.

2. If environmental education programs are to achieve their goals, teachers with expertise in all phases of the field will have to be provided. For this to occur, teacher education institutions must assume the major responsibility of providing all teachers with the knowledge and methodology necessary to undertake such a task.

3. Formal education alone cannot be held responsible for producing an environmentally literate citizenry. Governmental agencies and community organizations at all levels must actively involve themselves in coordinated efforts to encourage environmental educational endeavors. If this goal is to be achieved, it must be recognized that means of implementation are equally important to recognition of need.

The following recommendations pertain to future research in this area.

1. As the chronological age of the pupil appeared to be an important factor in determining the relative importance of some criteria, it is recommended that all criteria be re-examined relevant to their desirability at the Elementary, Junior High, and Senior High School teaching levels. In addition, if criteria related to student role and participation are not applicable to Elementary students, then there is a need to determine to what extent Elementary students are able to actively participate in environmental education activities.

2. There is a need to establish observable indicators that would become operative if conditions suggested by these criteria are embodied within environmental education programs. Such indicators might ultimately serve as an evaluation instrument for such programs.

3. While the establishment of these criteria are viewed as the initial step in bringing greater definition to environmental education, further research is needed to check the feasibility of specific implementation within the framework of the school.

4. As a result of the myriad implications of these findings upon teacher preparation programs, there would seem to be a need to examine the present offerings of teacher education institutions in the determination of the

extent to which present programs are providing teachers with the methodology and knowledge necessary for teaching environmental education.

5. In addition, there is a need to examine staff development opportunities through such indicators as ongoing inservice programs, field workshops, professional meetings, and graduate offerings at colleges and universities. Opportunities such as these are essential if teachers in the field are to be provided with the chance to develop or upgrade the knowledge and skills necessary to provide students with meaningful environmental education experiences.

6. Pilot programs in environmental education need to be established for the purpose of determining the effectiveness of the criteria in relationship to curriculum development and implementation. Research generated through such programs would provide input related to the feasibility of the criteria as an overall curriculum model for environmental education.

7. Finally, it is recommended that environmental education programs developed in the future be examined after a period of three to five years to determine if the validated criteria exist at that time to a greater extent than they do at the present. Program directors have affirmed that the criteria should be embodied in their programs. Implicit in this affirmation is the belief that future curriculum

development in environmental education will strive to incorporate conditions suggested by the validated criteria.

APPENDIX A

JURY LETTERS AND CRITERIA VALIDATION INSTRUMENT

MIAMI UNIVERSITY OXFORD, OHIO 45056

THE WILLIAM MCGUFFEY ELEMENTARY LABORATORY SCHOOL
OFFICE OF THE DIRECTOR

Telephone: 513, 529-7124,
529-7125

February 28, 1977

Thank you for your prompt and very kind response to serve as a member of this selected environmental education jury. The lending of your knowledge and professional expertise to this nationwide study is greatly appreciated. The enclosed validation instrument will require only a few minutes of your time. But your response will add immeasurably to the validation of the proposed criterion listing.

The enclosed validation instrument lists twenty-four proposed criterion statements relevant to environment education. You are asked to indicate your level of agreement with each criterion. For example, if you believe a proposed criterion is very important for environmental education and that an environmental education program should definitely meet this criterion, check category 1. If you believe that the proposed criterion has some importance for environmental education, but that it is not crucial for an environmental education program to meet this criterion, please check category 2. If you believe that a proposed criterion has no importance for environmental education, please check category 3.

In addition to indicating your level of agreement with each proposed criterion, space has been provided for you to add any comments or modifications you feel to be appropriate. This space may also be used to identify any additional criteria you believe to be relevant. Any comments or additions will be appreciated and will surely aid in validating the final criterion listing. Your comments or additions will be reported only in terms of the selected jury, not as an individual.

After completing the instrument, please return in the enclosed envelope at your earliest convenience. A prompt response will greatly facilitate the completion of this study. If you desire a summary of the completed study, please indicate in the space provided at the end of the validation instrument.

Thank you for your assistance.

Sincerely,

Donald A. Pribble
Department of Teacher Education
Miami University

MIAMI UNIVERSITY OXFORD, OHIO 45056

THE WILLIAM MCGUFFEY ELEMENTARY LABORATORY SCHOOL
OFFICE OF THE DIRECTOR

Telephone: 513, 529-7124,
529-7125

February 25, 1977

In recent years, environmental education has become a primary concern of professional educators. Experts from universities, public school systems, governmental agencies, and society at large are calling for schools to design and implement environmental education programs. But those who would design curriculum for such programs are hindered by a number of obstacles.

1) At the present time, there is no definition of environmental education that is accepted on a nationwide basis.

2) National criteria do not exist for the purpose of determining whether or not present curricula purported to be environmental education are, in fact, environmental education.

3) Minimal criteria, for the purpose of establishing an environmental education program, do not exist on a nationwide basis.

It is believed that environmental education cannot be effectively planned or implemented until such criteria are identified.

At the present time, I am a member of the faculty of the Department of Teacher Education at Miami University. I am initiating a nationwide study concerned with the need of identifying minimal criteria in the area of environmental education.

In an attempt to clarify a working definition, proposed criteria for environmental education will be constructed. The validity of the proposed criteria will be judged by a jury of recognized experts in the field of environmental education. A survey instrument will then be developed as a result of the jury evaluation and submitted to a sample population of environmental education program personnel. Because of your expertise and recognized contributions in the field of environmental education, I would be honored if you would serve as a member of this select jury. The validation instrument will require only a few minutes of your time and your response will be reported only in terms of the selected jury, not as an individual.

It is believed that the identification of such criteria will bring definition to environmental education, aid in planning and implementing environmental education programs, and ultimately facilitate the achievement of an environmentally literate citizenry.

If you can respond favorably to the invitation to serve as a member of the selected, nationally prominent jury, please fill out the enclosed card and return it at your earliest convenience. If you desire further information prior to responding, please call me collect at 513-529-6218. As a member of the jury a validation instrument will be mailed to you upon the receipt of the enclosed card. The benefit of your professional expertise will be greatly appreciated and will surely contribute to the field of environmental education.

Thank you for your consideration of this invitation.

Sincerely,

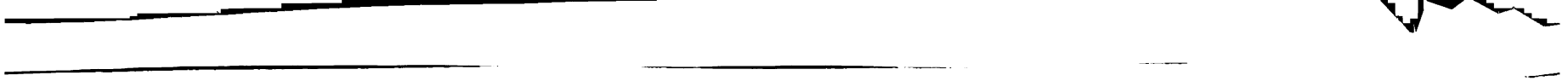
Donald A. Pribble
Department of Teacher Education
Miami University

Environmental Education
Criterion Listing

1 - Criterion is very important for environmental education.
2 - Criterion has some importance for environmental education.
3 - Criterion has no importance for environmental education.

	1	2	3
1. Curriculum for environmental education must be designed and implemented on a K-12 basis.			
2. An environmental education program must be integrated into existing curricula. It should not be designed and implemented as an additional subject area.			
3. Environmental education does not belong to any single discipline. The curriculum must include concepts and generalizations from many disciplines, primarily the natural and social sciences.			
4. Environmental education curricula must emphasize the importance of ecologically sound human values.			
5. The focus of environmental education curricula must be on real problems in the student's environment.			
6. Environmental education curricula must emphasize man's relationship to his natural, social, and man made environment. This includes both the urban and rural environments.			

Comments and/or modifications:



	1	2	3
7. An environmental education program must have a formalized statement of goals and objectives.			
8. Environmental education curricula must incorporate directed learning experiences in the outdoor environment.			
9. In conjunction with the recognition of environmental problems, environmental education curricula must provide students with factual knowledge concerning their environment.			
10. Environmental education curricula must incorporate and make use of resources within the local community.			
11. The development of environmental education curricula must include student input during the planning, implementation, and evaluation stages.			
12. In addition to being concerned with present environmental problems, environmental education curricula must be oriented toward future environmental concerns.			

Comments and/or modifications:

	1	2	3
13. Instructional strategies for environmental education must make use of values clarification techniques.			
14. Instructional strategies for environmental education must make use of the inquiry method.			
15. Instructional strategies for environmental education must facilitate the student's development of problem solving skills.			
16. Instructional strategies for environmental education must allow students to make decisions concerning real environmental problems and to evaluate the consequences of those decisions.			
17. Instructional strategies for environmental education must be action oriented, employing "hands on," experienced based learning activities.			
18. Instructional strategies for environmental education must facilitate the students' development of those process skills associated with data gathering and reporting.			

Comments and/or modifications:

		1	2	3
19.	A system wide environmental education program must have a designated coordinator who is responsible for curriculum development and facilitating the classroom teacher in implementing instructional strategies.			
20.	All teachers of environmental education must have access to a staffed, environmental education resource center away from the school.			
21.	All teachers of environmental education must be provided with a continuing in-service education program relevant to all components of environmental education.			
22.	All teachers of environmental education must show evidence of completed coursework at a college or university, relevant to environmental education.			
23.	Teachers of environmental education must meet minimal state certification requirements for environmental education.			
24.	The goals and objectives of local environmental education curricula must reflect statewide goals and objectives as set forth in a state master plan for environmental education.			

Comments and/or modifications:

_____ I would like to have a summary of this study.

APPENDIX B

ENVIRONMENTAL EDUCATION PROGRAM QUESTIONNAIRE

INSTRUCTIONS

This questionnaire is divided into two sections. Part I consists of general demographic items. Please answer each question as it applies to you, your project, or your school system.

Part II of this questionnaire measures your perceptions of the environmental education curriculum in your school or your project as it exists and as you believe it should exist.

In Part II, please respond twice to each item:
1. Rate the item in terms of conditions as they are.
2. Rate the item in terms of conditions as you think they should be.

In each of these two responses, you will select from the following six options and their corresponding values.

CONDITIONS AS THEY ARE		CONDITIONS AS THEY SHOULD BE	
Option	Value	Option	Value
Do Not Know	0	Do Not Know	0
Condition Does Not Exist	1	Condition Should Not Exist	1
Condition Exists Slightly	2	Condition Should Exist Slightly	2
Condition Exists Moderately	3	Condition Should Exist Moderately	3
Condition Exists To A Large Extent	4	Condition Should Exist To A Large Extent	4
Condition Exists To A Very Large Extent	5	Condition Should Exist To A Very Large Extent	5

EXAMPLE

	Conditions As They Are	Conditions As They Should Be
Our school system has implemented an environmental education program.	2	4

In the response, the person has said that the condition exists slightly (2) and he believes that the condition should exist to a large extent (4).

PLEASE REMEMBER

1. Respond to each item in Part I as it applies to you, your project or your school system.
2. Respond twice to each item in Part II, as explained above.
3. Items pertaining to students should be considered only in terms of kindergarten through twelfth grade students who participate in your program as a part of their formal, school education.
4. Please be honest, non-subjective, and use the 0 value only when you cannot make a judgment on these bases.

THANK YOU FOR YOUR ASSISTANCE!

PART I

1. Demographic Information

A. Sex ___ Male ___ Female

B. Age

___ a. 20 - 25 ___ c. 31 - 35 ___ e. 41 - 45 ___ g. 51 - 55
___ b. 26 - 30 ___ d. 36 - 40 ___ f. 46 - 50 ___ h. Over 55

C. How many years have you been directly involved with environmental education?

___ a. 1 - 2 ___ c. 5 ___ e. 7 ___ g. 9 ___ i. 11
___ b. 3 - 4 ___ d. 6 ___ f. 8 ___ h. 10 ___ j. 12 or More

D. Are you now, or have you ever been employed by a public or private school system?

___ yes ___ no

If yes, which of the following best describes your position within that system?

___ a. Environmental Education Coordinator
___ b. Assistant Superintendent for Curriculum and Instruction
___ c. District Science Education Coordinator
___ d. Building Principal
___ e. Senior High School; Chairperson - Science Department
___ f. Junior High School; Chairperson - Science Department
___ g. Classroom Teacher - Elementary School
___ h. Classroom Teacher - Junior High School
___ i. Classroom Teacher - Senior High School
___ j. Other _____

E. Which of the following academic areas do you consider to be your personal area of specialization?

___ a. Social Studies
___ b. Natural Sciences
___ c. Art
___ d. Music
___ e. Vocational Education
___ f. Mathematics
___ g. English/Language Arts
___ h. Physical Education

F. The population of the community served by your project is approximately:

___ a. Less than 1,000
___ b. 1,000 - 5,000
___ c. 5,000 - 10,000
___ d. 10,000 - 25,000
___ e. 25,000 - 50,000
___ f. 50,000 - 100,000
___ g. 100,000 - 500,000
___ h. 500,000 - 1,000,000
___ i. Greater than 1,000,000

Conditions As They Are	Do Not Know	Does Not Exist	Exists Slightly	Exists Moderately	Exists To A Large Extent	Exists To A Very Large Extent
VALUE	0	1	2	3	4	5
Conditions As They Should Be	Do Not Know	Should Not Exist	Should Exist Slightly	Should Exist Moderately	Should Exist To A Large Extent	Should Exist To A Very Large Extent

PART II	As Conditions Are	As Conditions Should Be
1. Students in all grades, K-12, receive instruction in environmental education.	____	____
2. Students who participate in your environmental education program attend a special environmental education class:		
a. In the Elementary School	____	____
b. In the Junior High School	____	____
c. In the Senior High School	____	____
3. Students who participate in your program do not attend a special environmental education class. They receive instruction as part of their regular coursework:		
a. In the Elementary School	____	____
b. In the Junior High School	____	____
c. In the Senior High School	____	____
4. The content for your environmental education program is drawn from many disciplines, primarily the natural sciences and the social studies.	____	____
5. Your environmental education program emphasizes the importance of ecologically sound human values.	____	____
6. Your environmental education program emphasizes the relationship between people and:		
a. The natural environment (those natural elements that exist independent of human influence.)	____	____
b. The man-made environment (those human made structures and conditions that exist because of human influence on the environment.)	____	____
7. There is a written statement of goals and objectives for your environmental education program.	____	____
8. Students who participate in your environmental education program gain factual knowledge about their environment.	____	____

Conditions As They Are	Do Not Know	Does Not Exist	Exists Slightly	Exists Moderately	Exists To A Large Extent	Exists To A Very Large Extent
VALUE	0	1	2	3	4	5
Conditions As They Should Be	Do Not Know	Should Not Exist	Should Exist Slightly	Should Exist Moderately	Should Exist To A Large Extent	Should Exist To A Very Large Extent

	As Conditions Are	As Conditions Should Be
9. Your environmental education program utilizes community resources.	____	____
10. Your environmental education program incorporates directed learning experiences in the outdoor environment.	____	____
11. Students who participate in your program have meaningful input regarding the planning, implementation, and evaluation of environmental education activities:		
a. At the Elementary level	____	____
b. At the Junior High level	____	____
c. At the Senior High level	____	____
12. Students who participate in your environmental education program work at solving real problems in their environment rather than simulated or textbook problems:		
a. At the Elementary level	____	____
b. At the Junior High level	____	____
c. At the Senior High level	____	____
13. In addition to dealing with present environmental problems, your program focuses on future environmental concerns.	____	____
14. Teachers and/or staff members in your program employ the inquiry method as an instructional strategy in your environmental education program.	____	____
15. Teachers and/or staff members in your program employ values clarification strategies when dealing with the values component of environmental education.	____	____
16. The development of problem solving skills is emphasized in your environmental education program.	____	____
17. Your environmental education program encourages children to be active learners both in and out of the classroom.	____	____

Conditions As They Are	Do Not Know	Does Not Exist	Exists Slightly	Exists Moderately	Exists To A Large Extent	Exists To A Very Large Extent
VALUE	0	1	2	3	4	5
Conditions As They Should Be	Do Not Know	Should Not Exist	Should Exist Slightly	Should Exist Moderately	Should Exist To A Large Extent	Should Exist To A Very Large Extent

	As Conditions Are	As Conditions Should Be
18. Students who participate in your environmental education program are given the opportunity to develop alternative solutions to real environmental problems, decide on a solution to the problem, act according to that decision, and evaluate the consequences:		
a. At the Elementary level	____	____
b. At the Junior High level	____	____
c. At the Senior High level	____	____
19. Instructional strategies in your environmental education program facilitate the development of those process skills associated with data gathering and reporting:		
a. At the Elementary level	____	____
b. At the Junior High level	____	____
c. At the Senior High level	____	____
20. The teachers who participate in your program have access to a staffed environmental education center.	____	____
21. Teachers who participate in your program are provided with an ongoing environmental education inservice program.	____	____
22. Teachers who participate in your program have completed coursework or workshops relevant to environmental education at a college or university	____	____
23. Teachers who participate in your program carry special certification for environmental education on their teaching certificates.	____	____
24. Your State Department of Education has a State Environmental Education Master Plan setting forth goals and objectives for environmental education.	____	____
25. The State Environmental Education Master Plan was used in developing curriculum for your program.	____	____

Thank you for completing this questionnaire. Your cooperation is greatly appreciated. Below, space is provided for any additional input you might have regarding this research. Any comments you might make will be appreciated.

Comments:

- - - - - - - - - - - - - - - - - - - -

If you desire a summary of this research, please fill out the information below. When the questionnaire is returned, this information will be detached to insure anonymity.

Thanks again for your cooperation!

Sincerely,

Donald A. Pribble

Name and Current Mailing Address:

APPENDIX C

POPULATION PROGRAMS*

ALABAMA

Nature and Man Environmental Study Area
Horseshoe Bend National Military Park
Dadeville, Alabama 36853

Project COPEE - A Conceptually Organized Program for Environmental Education
Mobile County Public School System
P.O. Box 1327
Mobile, Alabama 36601

ARIZONA

Environmental Living Program
Fort Bowie National Historic Site
P.O. Box 158
Bowie, Arizona 85605

Community Nature Center
Prescott Unified School District #1
P.O. Box 1231
Prescott, Arizona 86301

Freeman Homestead ESA
Saguaro National Monument
P.O. Box 17210
Tuscon, Arizona 85731

ARKANSAS

Backpacking: Environmental Education Project
Fayetteville Senior High School
1001 West Stone Street
Fayetteville, Arkansas 72701

Hot Springs National Park Environmental Study Area
P.O. Box 1860
Hot Springs National Park, Arkansas 71901

Arkansas Ecology Center
1919 West 7th Street
Little Rock, Arkansas 72202

CALIFORNIA

Big Stump ESA
Kings Canyon National Park, California 93633

Environmental Living Program (ELP)
John Muir National Historic Site
4202 Alhambra Avenue
Martinez, California 94553

East Bay Regional Park District
11500 Skyline Boulevard
Oakland, California 94619

Project MER
Alameda County Superintendent of Schools Office
685 A Street
Hayward, California 94541

Bear Valley National Environmental Study Area
Point Reyes National Seashore
Point Reyes, California 94956

Point Reyes Environmental Education Center (Clem Miller Environmental Education Center)
Point Reyes National Seashore
Point Reyes, California 94956

Community Educational Resources
Department of Education, San Diego County
6401 Linda Vista Road
San Diego, California 92111

Twentynine Palms Oasis NESA
Monument Headquarters, Joshua Tree National Monument
74485 National Park Drive
Twentynine Palms, California 92277

Environmental Living Program and Environmental Study Area
Yosemite National Park, P.O. Box 577
Yosemite National Park, California 95389

COLORADO

Energy and Society: Investigations in Decision Making
Biological Sciences Curriculum Study
P.O. Box 930
Boulder, Colorado 80302

CONNECTICUT

Environmental Education Center
Area Cooperative Educational Services
800 Dixwell Avenue
New Haven, Connecticut 06511

DELAWARE

Gripin and SEE (Science, Environment, and Education)
Appoquinimink School District
4th and Main Streets
Odessa, Delaware 19730

FLORIDA

Gulf Islands National Seashore
Environmental Studies Center
Gulf Breeze, Florida 32561

Fort Caroline's NESA Program
Fort Caroline National Memorial
12713 Fort Caroline Road
Jacksonville, Florida 32225

Curriculum Modification Through Environmental Studies
Martin County Schools' Environmental Studies Center
2900 N.E. Indian River Drive
Jensen Beach, Florida 33457

Union County Environmental Program
Union County High School
1000 S. Lake Avenue
Lake Butler, Florida 32054

Broad Spectrum Environmental Education Program
Center for Environmental Learning
School Board of Brevard County
615 Seminole Drive
Rockledge, Florida 32955

Environmental Education Excursions
Highlands County School Board
426 School Street
Sebring, Florida 33870

Nature's Classroom, Outdoor Learning Laboratory
Hillsborough County Public Schools
Morris Bridge Road
Thonotosassa, Florida 33592

GEORGIA

Environmental Education for the Secondary School
University of Georgia
Department of Social Science Education
210 Dudley Hall
Athens, Georgia 30622

Fernbank Science Center
DeKalb County Board of Education
156 Heaton Park Drive N.E.
Atlanta, Georgia 30307

Chickamauga-Chattanooga National Military Park
P.O. Box 2126
Fort Oglethorpe, Georgia 30742

Kennesaw Mountain National Environmental Study Area
Kennesaw Mountain National Battlefield Park
P.O. Box 1167
Marietta, Georgia 30061

Callaway Gardens
Ida Cason Callaway Foundation, Callaway Gardens
Pine Mountain, Georgia 31822

Fort Pulaski National Monument
P.O. Box 98
Savannah Beach, Georgia 31328

Okefenokee Cooperative Educational Services Agency
Route 5, Box 406
Waycross, Georgia 31501

HAWAII

Bird Park Environmental Study Area
Hawaii Volcanoes National Park, Hawaii 96718

NESA Program
City of Refuge National Historical Park
Honaunau, Kona, Hawaii 96726

Marine Social Studies
State Department of Education
P.O. Box 2360
Honolulu, Hawaii 96804

Waikiki Aquarium
University of Hawaii
2777 Kalakaua Avenue
Honolulu, Hawaii 96815

ILLINOIS

Project Creation
Title III, ESA, Illinois Office of Education
LaSalle-Peru Township High School
541 Chartres Street
LaSalle, Illinois 61301

Pollution Control Center
Oak Park and River Forest High School
201 N. Scoville Avenue
Oak Park, Illinois 60302

Upper Mississippi River ECO-Center Cooperative
ECO-Center Diffusion Project
Thomson, Illinois 61285

INDIANA

Environmental Education - Canoeing a Wilderness
Homestead High School
4310 Homestead Road
Fort Wayne, Indiana 46804

Conservation Public Speaking Contest
Indiana Farm Bureau, Inc.
130 East Washington Street
Indianapolis, Indiana 46204

Environmental and Outdoor Education Section, Department of Parks and Recreation
Environmental and Outdoor Education Nature Center
Eagle Creek Park
6515 DeLong Road
Indianapolis, Indiana 46254

Lincoln Living Historical Farm
Lincoln Boyhood National Memorial
Lincoln City, Indiana 47552

Environmental Education Program
Logansport Community School Corporation
2829 George Street
Logansport, Indiana 46947

Total Environment Education
New Albany-Floyd County Schools
802 East Market Street
New Albany, Indiana 47150

Self-Earth Ethic
Hayes Regional Arboretum
801 Elks Road
Richmond, Indiana 47374

Muscatatuck National Wildlife Refuge
P.O. Box 631
Seymour, Indiana 47274

Asherwood
Marion Community Schools
121 East River Boulevard, P.O. Box 808
Marion, Indiana 46952

IOWA

Project ECO - An Environmental Curriculum Opportunity
Ames Community School District
120 South Kellogg
Ames, Iowa 50010

Conservation Education Center
Route 1, Box 44
Guthrie Center, Iowa 50115

KANSAS

Shawnee Mission Environmental Science Laboratory
5800 West 107th Street
Shawnee Mission, Kansas 66207

KENTUCKY

Abraham Lincoln Birthplace National Historic Site
Route 1
Hodgenville, Kentucky 42748

Onyx Meadows National Environmental Study Area
Mammoth Cave National Park
Mammoth Cave, Kentucky 42259

Cumberland Gap National Historical Park
P.O. Box 840
Middlesboro, Kentucky 40965

Union College Environmental Education Center (NEED)
Route 2
Middlesboro, Kentucky

LOUISIANA

Environmental Education Program
St. Martin Parish School Board
305 Washington Street
St. Martinville, Louisiana 70582

MAINE

Project TREE
Brookside Elementary School
Drummond, Maine 04901

MARYLAND

Assateague Island National Seashore
Route 2, Box 294
Berlin, Maryland 21811

Rhode River Education Project
YMCA Camp Letts
P.O. Box 208
Edgewater, Maryland 21307

Oxon Hill Farm
National Capital Park - East
5210 Indian Head Highway
Oxon Hill, Maryland 20021

Catoctin Mountain Park
Thurmont, Maryland 21788

MASSACHUSETTS

Hatheway Environmental Education Institute
Massachusetts Audubon Society
Lincoln, Massachusetts 01773

MICHIGAN

Environmental Education Activities
Ann Arbor Public Schools
601 W. Stadium Blvd.
Ann Arbor, Michigan 48103

Discovery Through Outdoor Education
Macomb Intermediate School District
44001 Garfield Road
Mount Clemens, Michigan 48043

MINNESOTA

Environmental Learning Center
Isabella, Minnesota 55607

Hennepin County Park Reserve District
Box 32
Maple Plain, Minnesota 55359

MISSISSIPPI

Natchez Trace NEED Center
Natchez Trace Parkway
Rural Route 1, NT-143
Tupelo, Mississippi 38801

MISSOURI

George Washington Carver National Monument
National Environmental Study Area
P.O. Box 38
Diamond, Missouri 64840

Environmental Education Training Project
St. Louis Public Schools
5101 McRee Avenue
St. Louis, Missouri 63110

MONTANA

Billings Cooperative Environmental Education Program
Billings Public Schools
101 10th Street West
Billings, Montana 59102

Glacier National Park NESA's
Glacier National Park
West Glacier, Montana 59936

NEVADA

Lake Mead National Recreation Area
601 Nevada Highway
Boulder City, Nevada 89005

NEW HAMPSHIRE

SEA: Student Environmental Awareness
NH School Supervisory Union 58
Groveton, New Hampshire 03582

Squam Lake Science Center Inc.
P.O. Box 146
Holderness, New Hampshire 03245

NEW JERSEY

Environmental Education Center
Somerset County Environmental Education Center
190 Lord Stirling Road
Basking Ridge, New Jersey 07920

Gateway National Recreation Area
Sandy Hook Unit, P.O. Box 437
Highlands, New Jersey 07732

The Committee for a Better Environment, Inc.
P.O. Box 209
Holmdel, New Jersey 07733

Vineland Public Schools Environmental Education Project
371 West Forest Grove Road
Vineland, New Jersey 08360

NEW MEXICO

Environmental Study Areas
White Sands National Monument
P.O. Box 458
Alamagordo, New Mexico 88310

Bandelier National Monument
Los Alamos, New Mexico 87544

NEW YORK

Environmental Action Coalition
156 Fifth Avenue, Suite 1130
New York, New York 10010

Sagamore Hill Environmental Study Area
Sagamore Hill National Historic Site
Cove Neck Road, Box 304
Oyster Bay, New York 11771

NORTH CAROLINA

Environmental Education Programs
Charlotte-Mecklenburg Schools
P.O. Box 149
Charlotte, North Carolina 28230

Environmental Science Program
Granite Falls Elementary School
P.O. Box 466
Granite Falls, North Carolina 28630

Murphy High School Nature Trail
Murphy High School
Murphy, North Carolina 28906

OHIO

Mound City Group National Monument
Route 1, Box 1
Chillicothe, Ohio 45601

You and the Environment
Educational Research Council of America
Rockerfeller Building
Cleveland, Ohio 44113

International Field Studies
Offices at Capital University
2199 E. Main Street
Columbus, Ohio 43209

Mohican School in the Out-of-Doors, Inc.
Mansfield School in the Out-of-Doors
Route #2, Box 287
Loudonville, Ohio 44842

Maple Heights Environmental Education Program
Maple Heights City School District
5500 Clement Drive
Maple Heights, Ohio 44137

OKLAHOMA

Outdoor School Education Program
Moore Public Schools
300 North Eastern
Moore, Oklahoma 73160

OREGON

Multnomah Outdoor School
Multnomah County Intermediate Education District
220 S.E. 102nd, P.O. Box 16657
Portland, Oregon 97216

PENNSYLVANIA

Lower Milford Outdoor Conservation and Education Center
Southern LeHigh School District
Box 567, Rd #2
Coopersburg, Pennsylvania 18036

Summit Environmental Study Area
Allegheny Portage Railroad National Historic Site
P.O. Box 247
Cresson, Pennsylvania

Baptism Creek Environmental Study Area
Hopewell Village National Historic Site
R.D. #1, Box 345
Elverson, Pennsylvania 19520

Round Tops Environmental Study Area
Gettysburg National Military Park
Gettysburg, Pennsylvania 17325

Outdoor Education Program
Lower Dauphin School District
260 Schoolhouse Road
Middletown, Pennsylvania 17057

Sites for Environmental Education Development
Northampton County Conservation District
R.D. #4
Nazareth, Pennsylvania 18064

Elementary Agriculture Program
Eastern Lancaster County Schools
New Holland, Pennsylvania 17757

Environmental Agriculture Program
Garden Spot High School
New Holland, Pennsylvania 17757

Schuylkill Valley Nature Center for Environmental Sciences
Hagy's Mill Road
Philadelphia, Pennsylvania 19128

SOUTH CAROLINA

Oceanographic Sciences Conceptual Schemes Project, ESEA Title III
Charleston County Public Schools
3 Chisolm Street
Charleston, South Carolina 29401

TENNESSEE

Fort Donelson ESA
Fort Donelson National Military Park
P.O. Box F
Dover, Tennessee

Department of Environmental - Outdoor Education
Nashville Metro Schools
500 20th Avenue N.
Nashville, Tennessee 37203

Environmental Study Areas
Shiloh National Military Park
Shiloh, Tennessee 38376

TEXAS

Padre Island National Seashore
9405 South Padre Island Drive
Corpus Christi, Texas 78418

UTAH

Cave Tours
Timpanogos Cave National Monument
RFD 2, Box 200
American Fork, Utah 84003

The Mill Hollow Center
340 E. 3545 S.
Salt Lake City, Utah 84115

VERMONT

Vermont Institute of Natural Science
Woodstock, Vermont 05091

VIRGINIA

Turkey Run Farm
George Washington Memorial Parkway
McLean, Virginia 22101

Comprehensive School Environmental Program
Orange County School Board
P.O. Box 349
Orange, Virginia 22960

Jefferson National Forest Youth Conservation Corps
Box 1069
Wise, Virginia

WASHINGTON

Survival in Our Environment
Harvard Elementary School
The Franklin Pierce School District No. 402
315 South 129th Street
Tacoma, Washington 98444

WEST VIRGINIA

Tree Sense
Children's Museum of Sunrise
755 Myrtle Road
Charleston, West Virginia 25314

Opening the Outdoors to Learning
Philippi Elementary School, Barbour County Schools
Philippi, West Virginia 26416

Outdoor Sciences - Awareness and Appreciation
Doddridge County Board of Education
West Union, West Virginia 26456

WISCONSIN

Environmental Education Program
Southern Door High School
Brussels, Wisconsin 54204

Chetek Chain of Lakes Impact Study
Chetek High School
Chetek, Wisconsin 54728

Trees for Tomorrow Four Seasons Environmental Center
Eagle River, Wisconsin 54521

Project I-C-E (Instruction-Curriculum-Environment)
1927 Main Street
Green Bay, Wisconsin

MacKenzie Environmental Education Center
Wisconsin Department of Natural Resources
Poynette, Wisconsin 53955

Central Wisconsin Environmental Station
College of Natural Resources
The University of Wisconsin-Stevens Point
Stevens Point, Wisconsin 54481

Ecology and Human Values
Sun Prairie Senior High School
Sun Prairie, Wisconsin 53590

School Forest Camp
Outdoor Education and School Forest
Wausau District Public Schools
407 Grant Street
Wausau, Wisconsin 54401

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*John F. Disinger, A Directory of Projects and Programs in Environmental Education, U.S. Educational Resources Center, The Ohio State University, December, 1976.

APPENDIX D

LETTERS TO POPULATION PROGRAM DIRECTORS

MIAMI UNIVERSITY OXFORD, OHIO 45056

THE WILLIAM MCGUFFEY ELEMENTARY LABORATORY SCHOOL
OFFICE OF THE DIRECTOR

Telephone: 513, 529-7124,
529-7125

October 7, 1977

In recent years, environmental education has become a primary concern of professional educators. Experts from universities, public school systems, governmental agencies, and society at large are calling for schools to design and implement environmental education programs. But those who would design curriculum for such programs are hindered by a number of obstacles. At the present time, there is no nationally accepted definition of environmental education. In addition, minimal criteria do not exist for the purpose of planning, implementing, or evaluating environmental education programs. It is believed that curriculum development in this area will be greatly enhanced by the identification of such criteria.

At the present time, I am a member of the faculty of the Department of Teacher Education at Miami University. I have initiated a nationwide study concerned with the need to identify minimal criteria in the area of environmental education. To date, data have been collected from State Departments of Education and State Universities. In order to insure the validity and reliability of this research, input from existing environmental education programs is desired.

The enclosed survey instrument is currently being mailed to a select nationwide sample of key environmental education programs. As the director of such a program, your response will contribute significantly to the results of this study. The survey instrument will require only a few minutes of your time and your response will be reported only in terms of the selected sample, not as an individual.

If you can respond favorably to this invitation, please fill out the enclosed instrument and return it by October 25, 1977, as time is a crucial factor in this research. A stamped return envelope is enclosed for your convenience. If you desire further information prior to responding, please call me collect at 513-529-6218. As a participant in this research, a summary of the findings will be forwarded to you upon completion of the study. The benefit of your professional expertise will be greatly appreciated and will surely contribute to the field of environmental education.

Thank you for your consideration of this invitation.

Sincerely,

Donald A. Pribble
Department of Teacher Education
Miami University

MIAMI UNIVERSITY OXFORD, OHIO 45056

THE WILLIAM MCGUFFEY ELEMENTARY LABORATORY SCHOOL
OFFICE OF THE DIRECTOR

Telephone: 513, 529-7124,
529-7125

Recently you received a letter inviting you to participate in a nationwide research project designed to identify minimal criteria for environmental education. The success of this research is dependent upon people with practical experience in environmental education programs. Only directors of selected programs, nationwide, were asked to provide data, therefore your response is crucial to the outcome of this study. Please take a few minutes at this time to complete the brief questionnaire. Your willingness to share the knowledge gained from your experiences will be of great benefit to others who wish to initiate environmental education programs in their schools or communities. For your convenience, another copy of the instrument is enclosed.

All of us involved in this research look forward to your response. Your cooperation in this endeavor is greatly appreciated. Thank you for your consideration.

Sincerely,

Donald A. Pribble
Department of Teacher Education
Miami University

APPENDIX E

ENVIRONMENTAL EDUCATION CRITERIA

VALIDATION JURY

Mr. Jack Davidson
Los Angeles County Schools Office
9300 E. Imperial Highway
Downey, CA 90242

Dr. Stephen A. Henderson
Model Laboratory School, Eastern Kentucky University
Richmond, KY 40475

Dr. Clifford E. Knapp
Ridgewood Public Schools
49 Cottage Place
Ridgewood, NJ 07451

Dr. George T. Ladd
Campion 219, Boston College
Chestnut Hill, MA 02167

Dr. James W. Latham, Jr.
Science Supervisor, Maryland State Department of Education
Baltimore, MD 21240

Dr. Gerrard F. MacMillan
IOWA-ASSIST
Science Education Center, University of Iowa
Iowa City, IA 52242

Dr. Jack Mason
McGuffey Laboratory School, Miami University
Oxford, OH 45056

Dr. Jack O'Leary
Science Supervisor, State Department of Education
Carson City, NV 89701

Dr. Richard Rocchio
6285 W. Coal Mine Place
Littleton, CO 80123

Dr. Robert E. Roth
Chairman, Division of Environmental Education
School of Natural Resources, The Ohio State University
124 West 17th Avenue
Columbus, OH 43212

Dr. William B. Stapp
Chairman, Environmental Education and Outdoor Recreation Program
School of Natural Resources, University of Michigan
Ann Arbor, MI 48104

Dr. Malcolm D. Swan
Box 299 - LTFC
Oregon, IL 61061

Raymond E. Thiess
Specialist, Science Education
State Department of Education
942 Lancaster Drive, N.E.
Salem, OR 97310

Dr. Edward White
Science Service, State Department of Education
P.O. Box 6Q
Richmond, VA 23216

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Books

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