AN EVALUATION OF AN OUTDOOR CONSERVATION EDUCATION LEADERSHIP TRAINING PROGRAM

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PREFACE

This study is concerned with an evaluation of an outdoor conservation education leadership training program and the factors involved in implementation of outdoor programs by educators.

I would like to express my appreciation and extreme gratitude to Dr. Terence J. Mills, III, chairman of my committee, for his interest, guidance, enthusiasm, support, long hours, and encouragement which has made this study an enjoyable as well as educational task; and to Dr. Thomas Johnsten and Dr. Dwaine Eubanks for their assistance.

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CHAPTER I

NATURE OF THE PROBLEM

Introduction

Inservice education of teachers as defined by Edelfelt and Johnson[1] is any professional development activity that a teacher undertakes singly or with other teachers after receiving his initial teaching certificate and after beginning professional practice. In addition, the purposes of inservice are:

1. To enhance understanding and capabilities by sharing experiences, knowledge, and ideas on inservice teacher education.

2. To identify problems and issues in inservice teacher education.

3. To reexamine and redefine the purposes of inservice teacher education.

4. To examine the respective roles and responsibilities (including financing) of the institutions, agencies, and organizations involved in inservice teacher education.

5. To identify promising new approaches to and models for inservice teacher education.

6. To examine the requirements for and the structure, organization, and governance of inservice teacher education.

7. To develop recommendations for the improvement of inservice teacher education.

A review of a history of inservice in the United States shows that in the 1850's, 60's, and 70's teachers depended on two or three day institutes and short courses in the evening to furnish inservice education. The purpose of these institutes was to enable teachers to bridge the gap between what they were supposed to know and what the real level of their knowledge was. At that time thousands of teachers were employed who had little or no preparation for teaching. From 1880 until World War I summer courses in the normal schools were the most important agencies of inservice education. After World War I and during the depression, inservice was affected by the establishment of quantitative standards for teaching certificates. From 1918 until 15 or 20 years later, inservice programs were aimed primarily at helping fill gaps in college degree requirements. Today, much less attention is given to remedying gross deficiences in the pre-service preparation of teachers.[2]

Workshops, first called by that name in the 1930's were intended to be problem-solving, action-oriented inservice work groups.[3] The first workshop was held during the summer of 1936 on the campus of Ohio State University.[4] During the workshop, the teachers actually worked on the development of instructional resource units and the devices to evaluate these curriculum elements.[5] Today the workshop continues to be the most popular form of inservice education. The workshop has certain characteristics that make it a valuable means of inservice education. Among these are the following as stated by Moffitt:[6]

1. It emerges to meet the existing needs of the participants;

2. It provides expert assistance (commonly from higher institution);

3. It is flexible and consequently can be adapted to many diverse groups and situations;

4. It provides for the pooling of information and sharing of experiences;

5. It motivates participants to change their behavior where and when such changes may be helpful;

6. It gives added support to a changing program by assuring approval of the group;

7. It develops both individual and group skills in attacking new problems;

8. It adds morale to a faculty or a school system;

9. It strengthens working relations with others in different status assignments;

10. It develops knowhow in utilizing democratic procedures in other situations (such as teachers working with students);

11. It redefines and refines the objectives of education;

12. It evaluates both the results of the effort and the process by which results are attained.

Certain situations or conveniences appear to enhance the success of the workshop. Among these are the following:

1. Appropriate physical conditions for group action (meetings may be successful if held out of doors or at least at some distance from the school);

2. Availability of consultants where and when assistance is needed;

3. Assistance of a secretary-recorder with paper, pencils, and such items that may be needed by participants;

4. Access to bibliographies dealing with the problem of major concern;
5. Access to library facilities.

Workshops emphasize informality, and establish good rapport. Participants generally become highly active and learn to do by doing.[7]

The workshop was the logical methodology to employ to train teachers in outdoor leadership techniques. Therefore, during the summer of 1975 an experimental program was held at East Central State University in ourdoor conservation education leadership training. The success of this program led to the development of an expanded program during the summer of 1976. The purpose of this study is to determine to what extent this program was successful in meeting the goals of the workshop.

Statement of the Problem

During the summer of 1975 an outdoor conservation education leadership training program was held with the assistance of the Pontotoc Conservation District in the form of scholarships and the help of the Oklahoma Conservation Commission in the form of resource personnel. Due to the number of participants establishing outdoor conservation education programs, the decision was made to expand the program. Consequently in the summer of 1976 a program was designed to attempt to attract teachers from various parts of the state to a summer workshop. The Oklahoma Conservation Commission again participated by suggesting that local conservation districts provide scholarships and support personnel. Participants studied for the first two weeks of the four-week program at three centers: one in Tulsa, one in Stillwater, and one in Ada. The participants were then brought together for the second two weeks at Goddard Youth Camp in central Oklahoma for field studies. During the first two weeks, classroom experiences were provided as well as some fieldtrip experiences. The participants commuted to and from classes during that time period. Staff members from each center rotated through each of the three centers for two of the ten days to develop some commonality of instruction. The final two weeks of instruction were carried out in residence at Goddard Youth Camp. During this time period, the staffs of the three centers met and worked with one another. The primary emphasis during this phase of the program was on extensive field studies to further support and extend instruction carried on during the first two weeks in the classroom.

The goals of the workshop were:

1. To raise the level of awareness and interest in environmental science teaching materials and activities present in contemporary K-12 curriculum projects.
2. To provide the methodologies and techniques consistent with the philosophies and theories underlying the development and implementation of contemporary K-12 environmental science curriculum projects.
3. To identify the multi-disciplinary relationships existing between the sciences and communication skills, social science, art, music and mathematics as they pertain to a holistic study of the environment.
4. To identify, experience, and appreciate the potential of effective out of school environments as powerful learning tools.

5. To develop models and methodologies which will allow the identification and assessment of national, state, and school community resources, capabilities and needs with respect to environmental education.
6. To develop an action plan for implementation of an environmental science education component in the participants' respective school curriculum.
7. To create a learning environment where psychomotor, cognitive, and affective interactions are intensified to maximize the process of people learning from each other.
8. To acquire knowledge, concepts and principals of ecology as they relate to understanding current environmental issues, production and control of natural populations, and decisions concerning social, and ecological planning.
9. To acquire the science content background prerequisite to implementation of contemporary K-12 environmental education programs and to identify the principals unifying cellular, organismal, population, and ecological studies.
10. To develop a local outdoor environmental study site.

The purpose of this study was to determine to what extent the stated goals of this workshop were met by the participants that completed the workshop requirements.[8]

Comparisons were made between rural and urban teachers, male and female teachers, teachers who have received degrees recently, and those who received degrees earlier, teachers who have science backgrounds and those who do not have science background, and teachers with different amounts of teaching experience to determine which teachers were more likely to implement outdoor conservation education programs.

Hypotheses

H_o2 There is no significant difference between pre-conservation environmental content knowledge and post-conservation program environmental content knowledge.

H_o2 There is no significant difference between pre-conservation program curriculum awareness and post-conservation curriculum awareness levels.

H_o3 There is no significant difference between types of pupil experience prior to and following the summer of 1976.

H_o4 There is no significant difference between pre-conservation program subject matter taught and post-conservation program subject matter taught.

H_o5 There is no significant difference in implementation between teachers who received their bachelor's degree after 1970 and those teachers who received their bachelor's degree before 1970.

H_o6 There is no significant difference in implementation between teachers from rural areas and teachers from urban areas.

H_o7 There is no significant difference in implementation between male and female teachers.

H_o8 There is no significant difference in implementation between science and non-science majors.

H_o9 There is no significant difference between teachers implementation and their conservation concepts gain.

H_o10 There is no significant difference in implementation between teachers who are teaching science and those who are not teaching science.

H_o11 There is no significant difference in implementation between teachers who receive administrative support and those who do not receive administrative support.

Research Questions

1. What are the most common constraints encountered by teachers when attempting to implement outdoor conservation education programs?
2. Do implementation activities increase the participation of others in outdoor education?
3. Do teachers participating in training programs receive assistance from local conservation districts?
4. What form of assistance do teachers who implement outdoor conservation education programs receive?
5. Do teachers receive assistance from agencies other than conservation districts in attempting to implement outdoor programs?
6. What are the other sources of help teachers receive?
7. What proportion of teachers in the program plan to continue the outdoor programs they began in the academic year of 1976-77?
8. What proportion of teachers established outdoor study sites?
9. How many students were involved in outdoor programs established in the academic year following the workshop?
10. Do inservice programs result from teachers' involvement in the workshop?

11. Do teachers who implement outdoor conservation education programs receive publicity?

Assumptions of the Study

1. The participants responded to the questionnaire honestly.
2. The teaching assignment of the participants did not change during the academic year 1976-77.

General Procedures

Teachers from 21 counties in the state of Oklahoma were represented at the workshop. Information concerning the nature of the summer workshop was made available to teachers and administrators throughout the state of Oklahoma. Information appeared in the Oklahoma Science Teachers Association Newsletter, the Oklahoma Educator, and brochures were distributed. Those teachers interested in attending the workshop were asked to fill out a form stating their current teaching assignment, their reasons for wanting to participate in the workshop, and biographical data. The participants received scholarships from their local conservation districts in varying amounts according to the resouces of the local district. Counties that had only a few participants were able to provide full scholarships. Other counties provided only partial scholarships.

Pre- and post-tests were administered to the participants. Eight months following the workshop, all participants were sent a questionnaire to determine the form of implementation they had achieved during the academic year 1976-77.

Following the workshop, each of the participants was required to turn in a research paper. The paper was to include the following: names of local, state, and federal resource personnel; a list of local, state, and federal materials; a school study site survey map; a school study site survey; unit outlines; materials and supply list.

Significance of Study

It is anticipated that this study will help determine the effectiveness of this type of workshop and will clarify the problems inherent in developing outdoor conservation education sites and programs. This information will assist in selecting content and structuring future inservice programs dealing with outdoor education both for the public school systems and the universities.

Limitations of the Study

The subjects of this study were limited to the participants in the 1976 Outdoor Conservation Education Leadership Training Program who successfully completed the workshop.

Definitions

Workshop. A problem-solving, action-oriented inservice work group.[9]

Environmental Education. That aspect of man's education that deals with culturally imposed, ecologically-related problems in man's environment . . . further, the acquisitions and application of human values as related to the cultural use and misuse of biotic and abiotic resources.[10]

Outdoor Education. Instruction in concepts related to the outdoors.

Out-of-doors. That instruction that takes place outside the regular classroom.

Environmental Curriculum. Curriculum designed to teach environmental concepts.

Resource People. Local, state, and federal personnel available to lend support in various ways to implementation of outdoor education programs.

Urban. City with a population greater than 5000.

Rural. City with a population of 5000 or less.

Science Major. Major field of study at the college level in Life, Physical, or Earth Sciences.

Non-Science Major. Major field of study at the college level in a field other than Life, Physical, or Earth Sciences.

Content Level. Scores on the content portion of the pre-post test.

Conservation Education. Instruction in concepts related to conservation.

Implementation. Teachers' yes or no response to whether they did or did not implement an outdoor education program.

FOOTNOTES

[1]R. A. Edelfelt, and M. Johnson. Rethinking In-Service Education (Washington, D.C., 1975), p. 5.

[2]R. W. Tyler, "In-Service Education of Teachers: A Look at the Past and Future," Improving In-Service Education: Proposals and Procedures for Change (Boston, Massachusetts, 1971), p. 13.

[3]Edelfelt and Johnson, Rethinking, p. 14.

[4]Tyler, p. 14.

[5]Ibid.

[6]R. Moffit, In-Service Education for Teachers (Washington, D.C., 1963), p. 26.

[7]Ibid., p. 27.

[8]Proposal Conservation Education Workshop (Stillwater, Oklahoma, 1976), pp. 2-7.

[9]Tyler, p. 10.

[10]W. J. Bluhm, and H. R. Hungerford, "Modifying Preservice Elementary School Teachers' Perspectives," Journal of Environmental Education, Vol. 5, No. 2 (Winter, 1973), p. 14.

CHAPTER II

REVIEW OF SELECTED LITERATURE

Background

Concern for the environment is certainly not a new emphasis in our country. Many decades ago we set aside public land areas to be preserved, and national and state parks and forests have resulted from these early efforts. We now have wilderness areas and National Seashores. Nature study was a major emphasis in many of our elementary schools in the early decades of this century. Conservation, and later ecology, became a fixture in many biology textbooks. Many agencies such as The National Audubon Society, the Nature Conservancy, The Sierra Club, and other organizations have served to further environmental concerns and interests. Many agencies such as the Boy Scouts and Girl Scouts with their camping programs have provided opportunities for thousands of young people to enjoy and learn about the out-of-doors. What was it that caused the rise of environmental concern in the 70's? According to Kelly:[1]

> Something very profound and important began to happen in the 1960's. Beginning with the publication of Rachel Carson's Silent Spring in 1962, and followed by an accelerating flood of similar writings, Americans were bombarded by a host of dire predictions of impending environmental catastrophes. At first, many of these writings were discounted as mere speculations of highly pessimistic observers. This reaction was supported by the optimists who saw technological innovation as the means to solve the potential crises protrayed by the pessimists. By the end of the decade, however, 'reality' began to coincide with the literature of catastrophe. Lake

> Erie was dying. Swordfish did contain toxic levels of mercury. In some parts of the country water was in drastically short supply. The upturned bodies of dead fish had confirmed the threat of fish kills. We were running out of silver and other mineral resources. 'Blackouts' and 'brownouts' had been experienced by millions of people. In short, the issue was no longer debatable--environmental deterioration was real and environmental concerns, ranging from sharpened academic interest to stark fear, were everywhere evident. It was in this setting that the contemporary environmental education was born.

Someday our youth will be adult members of a community and as citizens, no matter what their occupations may be, they will make decisions affecting not only the community in which they live, but also their country. To an increasing extent the votes they will cast and the choices they make will affect our natural resources and wise use of these resources. They will be asked to make decisions about recreation, parkways, beautification, water needs, and air and water pollution control. Since decisions on problems like these will affect the total environment in which we live, we must help our young people obtain the experiences and the knowledge necessary to assure wise decisions. If we are to assist youth to be more active in helping to solve environmental resource problems, we must provide them with the proper tools. It is imperative that these tools be identified, and that instructional programs be provided to help our youth acquire them as they proceed through our school systems.[2]

In response to growing concern about environmental problems, many elementary and middle school teachers have begun to attempt to help their students become better informed and more sensitive toward their environment. Many of these efforts have been rewarding as a means for involving students in important education about their environment. The total number of such efforts is still small and, when they do occur, do not always meet with success. Children may play the same games in different grades, collect litter repeatedly until they lose interest, and repeat trips to a nature trail to the point that the experiences become redundant and have no real meaning to the students. Environmental education is a new arrival on the curricular scene and lacks the history and traditions associated with established program areas. Few teacher-training institutions include environmental education in their preparation of elementary and middle school teachers.[3]

Status of Environmental Education

The status of environmental education preparation in colleges of education was the subject of a survey made by Trent[4] in 1972. This was the first national survey of the status of environmental science in colleges of education. He reported that environmental science content is being taught in a majority of the colleges, but that the methods of teaching environmental science are not.

In 1973, Trent reported the results of another survey of colleges of education and state departments of education. He found an increase between 1972 and 1973 in the number of colleges who offered courses in methods of teaching environmental science, but the per cent of colleges offering such courses was still only 33 per cent. He found that state environmental science programs were better financed in 1973 than they had been in 1972.[5]

In December of 1976, Trent reported that by 1976 the number of institutions offering courses on methods of teaching environmental science had risen to 41 per cent. This increase was paralleled by an increase in the number of faculty members who were engaged in federal, state, and local environmental science projects.[6]

The results of two surveys of the status of environmental education in the public schools were reported. The Nevada survey conducted by Trent[7] showed that little environmental education was being taught in the secondary schools of Nevada. The teachers indicated that they felt there were not enough adequate inservice courses in environmental science available to them. Additionally, they indicated that schools and teachers needed assistance in planning, developing and implementing environmental science courses and units.

The Colorado study by Bottinelli revealed that 95 per cent of the instruction in environmental education was conducted in social studies and science courses. The course instructor was the most frequent determiner of the content of environmental courses. Most of the instructors lacked preservice training in environmental fields which caused them to have deficiences in environmental concepts. The teaching strategies were mostly teacher-oriented lecture and discussion with textbook assignments. He indicated the need for increased teacher training at the inservice and college/university levels in environmental education.[8]

Research in Outdoor Education

Little research has been done in the area of outdoor education. It was not until the formation of the Council on Outdoor Education and Camping in 1964 that an active research committee in the area was established. An aggressive, rational, coordinated research effort is clearly needed according to Donaldson.[9] He suggests that a university should probably be the one to undertake this kind of research. He points out that the probable reason for the lack of research in outdoor education is that those people involved in outdoor education are the "action people" and are little inclined toward research. "Most of them are employed by public schools, where little or no premium is placed on either research or writing. If they engage in research at all, it will likely not be reported except locally."

There are few empirical studies which compare the methods of outdoor education with the traditional methodology of the classroom. In recent years, there has been an increase in this kind of study but it has been based upon inadequate research design and inadequate populations.[10]

Two studies were found dealing with outdoor education compared to indoor education. Howie[11] conducted a study to determine the effect of an outdoor environmental education program as compared to one that was conducted completely indoors. The two types of programs were then combined into an indoor-outdoor program and compared. The findings of his research indicated that environmental education programs should be built as an extension of the classroom, not as a unique experience. He found that the spontaneous discovery method did not produce the desired conceptualization. He said,

> The first job of environmental education is not to develop bigger and more vivid outdoor programs but to provide more extensive inservice training for the classroom teachers who probably have the greatest potential for motivating students in the area of environmental education.

In the summary of his article, Howie indicated that the most effective program should have four phases:

1. Teacher inservice training
2. Classroom development of advanced organization
3. Outdoor experience

4. Follow-up in the classroom with further application and conceptualization.[12]

Personal evaluative statements of teachers and staff indicated that the outdoor activities had a positive effect upon the students' outlook on education and ultimately on themselves which was a "glowing plus."[13]

A comparison was made by Chrouser[14] between outdoor and indoor laboratory techniques in teaching biology to preservice elementary teachers. He states in his conclusions:

> A biology course for prospective elementary school teachers which emphasizes field experiences during much of the laboratory time is more effective than a course using only the indoor laboratory in helping students achieve (1) understanding of the social aspects of science, (2) understanding of selected appropriate biological principles, and (3) understanding of science and process. A biology course for prospective elementary school teachers which emphasizes field experiences during much of the laboratory time is neither more nor less effective than a course using only the indoor laboratory in helping students achieve (1) understanding of biological principles in general, and (2) critical thinking ability.

Subjective behaviors observed but not measured showed that the outdoor group seemed more anxious for class to begin than the indoor group. The outdoor group seemed to sense a "deeper understanding" of their role in the environment and that their environment in turn must be "fit" for them. Chrouser stated that there is no substitute for a field laboratory in this kind of preparation at a time when awareness and understanding of the environment may mean individual and social survival. If a course has as an objective to acquaint the student with the interaction of science technology and society, then the nature of the scientific enterprise and the social responsibilities of science and scientists should include much time in the field as part of the laboratory or lecture time.[15]

Very little research has been done in the area of teacher education. Obviously research is needed in this area in order to determine the types of programs necessary to make the teacher comfortable in teaching outdoor education.[16]

Hardy[17] points out that if schools of teacher education are to do their part in helping to solve what is perhaps the "gravest problem of our time--ecological imbalance and environmental deterioration," they must begin at once to promote the problem solving method of education. Hardy states that the best way to achieve a sound program of environmental education is to include in the teacher education sequence certain units of study designed to help prospective teachers to become more aware of the environmental crisis and also to strive for a solution to this problem. Since methods classes generally involve the preparation of resource units on various topics, there is no reason not to have prospective teachers prepare resource units on environmental subjects involving the various methods--lecture, demonstration, lecture-discussion, role playing, and simulation. This will prepare the prospective teacher to think about programs of environmental education and to promote them intelligently in the public schools.

Man is going to have to adapt his way of thinking about himself and his relationship to the natural environment. It is in this adapting that teacher education can make a valuable contribution in creating environmental awareness and responsibility.[18]

Objectives of Environmental Education

Many different agencies have come out with resolutions concerning the desirability of environmental education. The NEA Resolution on

Environmental Education is as follows:

> NEA's Representative Assembly passed resolution A-4 Environmental Education, in 1973, reaffirming it in 1974, 1975, and 1976.
>
> 'The National Education Association believes the nation's priorities must include the protection of our environment. It urges the development and improvement of federal legislation, programs, and appropriations that provide education: (a) for use, stewardship, and preservation of a viable environment; (b) to eliminate pollution; (c) to promote an understanding by students and the public of the effects of past, present, and future population growth patterns on world civilization and human survival; and (d) to promote establishment of federal Wilderness Areas.
>
> The Association urges its affiliates to support environmental programs in school systems for grades K through adult.
>
> The Association encourages local affiliates to establish procedures to assure the policies and practices adopted by governing boards are consistent with environmental concerns.'[19]

The major objectives of environmental education seem to be reasonably widely agreed upon, according to Kelly,[20] as the following:

1. To obtain a clear understanding that man is in an inseparable interrelationship with his environment.
2. To obtain a broad understanding of the interrelations among ecosystems and natural resources.
3. To develop an understanding of man's environmental problems and the decision-making skills to solve them
4. To develop attitudes which will foster postive action relative to the environment.

Kelly[21] also gives a representative example of the characteristics of a suitable program:

1. The environmental education program should be interdisciplinary.
2. Environmental education should be an integral, nonappendage, curricular component.

3. Environmental education programs should stress the process of inquiry.

4. Environmental education should deal with the total environment: interrelationships of the natural, social, and manmade environments.

5. Environmental education should incorporate a balance among cognitive, affective, and psychomotor domains of educational objectives.

6. Environmental education experiences should reflect the developmental stages of pupils.

7. Environmental education programs should be planned by school and community across the kindergarten through adult span.

8. Environmental education programs should utilize a variety of teaching aids and materials.

In Project Leap, Rowley-Rotunno[22] states that the guidelines for environmental studies should be:

1. A vital approach to teaching about man's interrelationships with his natural environment.

2. An integrated process dealing with man's natural and manmade surroundings.

3. An experience-based learning, using total human, natural, and physical resources of the school and surrounding community as an education laboratory.

4. A multi and interdisciplinary approach that relates all subjects to a whole earth with a singleness of purpose.

5. An area directed toward survival in an urban society.

6. A life centered approach toward community development.

7. A rational process to improve the quality of life.

8. A rational process geared to developing behavior patterns that will permanently endure.

Inservice Programs

A review of the literature reveals that there is currently a state of inadequate preservice environmental education and methodology being taught in the colleges and the universities. How, then, are we to provide the necessary instruction to adequately prepare our teachers to educate students in the realm of environmental education? Inservice programs may be the answer.

Inservice education has long been proposed as a necessity for effective education practice and this is more true today than ever before. Teachers, like so many others, are victims of change brought about by a very rapidly changing technological society.[23]

Through inservice programs the "teaching teacher" who has experience and is gaining more experience can begin to comprehend, to analyze, to plan, to experiment--all with the meaning that comes with the "real thing."[24]

If our youth are to develop proper attitudes concerning their environment, according to Stapp,[25] we should provide environmental learning experiences. However, few teachers are trained in our colleges and universities to use the community environment to enrich instructional goals. For this reason a comprehensive inservice teacher training program should be developed so that teachers are more effective in helping youth to acquire the skills and the knowledge essential in contributing to the solution of environmental resource problems.

Suggestions for a comprehensive inservice teacher training plan include the following:

1. Clear statement of objectives
2. Time sequence regarding when offerings will occur throughout the school year
3. Blending of community environmental experiences with indoor presentations
4. Provision for experiences to occur on school sites
5. Development of written material that will offer information as well as methodology
6. Involvement of teachers at all grade levels and subject areas
7. Promotion and publicity of local collegiate offerings and scholarship programs that relate to conservation.[26]

Inservice education may be the answer to the problem of educating teachers in the methodology necessary to teach environmental education. Inservice education can be designed in various formats. Anticipated outcomes of a teacher education program include the teacher's competency in the subject matter and change in attitude toward the program, according to White.[27] Variables contributing to this anticipated outcome include:

1. Location of the program
2. Previous teaching experience
3. Previous science courses
4. Relevance of the teacher education program to grade level taught.

Teachers teaching teachers was the format for inservice that was used in one Florida program.[28] This program emphasized intensive teacher training programs to create interest, understanding, and sensitivity about the environment, and to develop the skills necessary to teach and motivate students to responsible social and political action.

The Florida program considered the fact that teachers are educators and all educators must play a role in effective interdisciplinary environmental education programs. They felt that by teaching teachers to teach teachers a multiplying effect would be achieved. Their plan called for the traditional environmental education sequence of developing awareness, sensitivity, and understanding, as well as motivating social action. In addition it provided teachers with the methods for holding similar workshops by involving them in planning, conducting, and evaluating these workshops. The advantages of this program would be low cost, speed, and effectiveness in contacting many teachers in a short period of time.

Their program was to be carried out in the following four phases:

Phase I--State Meeting with an attendance of 130

Phase II--Regional Workshops (7) Attendance of 600

Phase III--District Workshops (35) Attendance 3,500 (Estimated)

Phase IV--Local School Workshops (350) Attendance 35,000

The Florida program with its teacher teaching teachers program seems to result in teacher involvement in planning, conducting, and evaluating environmental education workshops. The program focused local resources on problems which involved the community. It produced teachers with an awareness and understanding of the environment and equipped them with the methods and techniques to help others learn about the program and from it.[29]

A program similar to the Florida plan was undertaken by educators in Oklahoma. A priority of the Oklahoma program was to train elementary teachers so that they could provide leadership at the local school level. The National Science Foundation funded a project to train teams of leaders in various school systems throughout the state. Three groups of approximately 50 educators each attended workshops at the Oklahoma Geology Camp. The majority of the participants were elementary teachers with secondary science teachers and administrators from each of the 19 school systems participating.[30]

The Oklahoma program included three components: outdoor education, curriculum study, and action planning. The outdoor education component was designed to prepare the educator to explore the immediate environment. The curriculum study component was an open-ended, self-paced, laboratory approach. The action planning component was designed to have participants demonstrate how they would use the knowledge they had acquired. Each educator helped to write the action plan for his group and committed himself to serve as a resource person in dissemination workshops.[31]

The factors which the Oklahoma educators involved believed were essential to the success of the program were:

1. A group commitment from a local school system which involves not only the target population (in this case elementary teachers) but local resource persons and admininstrators. The participation of the secondary science teachers and administrators is probably the key element to change in the total system. Their roles as support persons and decision makers in support of the elementary teacher are vital.
2. Direct and constant contact with a rich and diversified environment. The Oklahoma Geology Camp was a particularly

splendid location with the high desert, foothills, and mountains in close proximity. The geologists and local ranchers were invaluable resource persons in establishing field trips with earth science, historical and archaeological, and general interest themes. Almost any setting will suffice, but it should contain examples of natural and manmade environmental factors with evident relationships, and should be at a location which will take the participants away from home.

3. A planned program similar to the one described here, but much more important, a program based upon the expressed needs of the target population and their school system.

The authors expressed the doubt that teachers who have never had experiences such as those experienced in the workshop could ever effectively develop the skills, concepts, and attitudes that characterize the truly environmentally aware teacher-leader. They believe strongly in the outdoor component of teacher education. "Experiencing it through participation is the only effective way."[32]

Indiana State University through the Science Teaching Center sponsored a three-week science education outdoor workshop for prospective or inservice K-12 teachers during the summers of 1970 and 1971.[33] The format of their program was multi-disciplinary with the instructional approach being informal and inquiry oriented. The participants completed science activities in the outdoors that could be readily adapted to their own instruction programs. Students in the program participated for 15 days of instruction which met for four hours during the morning each day. A combination of field and laboratory studies was used. Evaluation was accomplished by asking the students to write a critical evaluation for the entire course on the last day. As a result of the evaluation thus obtained, the following guidelines for future workshops were given:

1. Specific performance objectives should be an integral part of the course instruction. These objectives, stated in behavioral terms, would help the students plan and evaluate their own learning.
2. Programmed instruction should be developed to help students understand science concepts and techniques related to teaching science in the outdoors. This approach would permit greater flexibility and more emphasis on independent learning opportunities. An auto-tutorial laboratory would be useful.
3. The students should work in heterogeneous groups for selected activities. The contagious enthusiasm expressed by most elementary teachers and the knowledge of scientific concepts possessed by secondary teachers is a valuable experience for both groups. However, if the groups remain intact for a great period of time there seems to be a tendency for the secondary teacher to become a lecturer and the elementary teacher becomes a passive listener.
4. Portions of selected activities should be conducted at night. For example, the habits of crepuscular and nocturnal animals could be studied more directly and effectively if the students were at the field campus during this period.
5. The length of the workshop should be lengthened to include a greater number of experiences and to provide time for more in-depth study.[34]

We have seen that the use of the outdoors is indeed a powerful tool in environmental education. According to Kingsley,[35] "All that is required is an adventuresome and innovative teacher. The children will provide the naturally inquiring minds." The most important thing we can do is to make the classroom teacher comfortable teaching in the outdoors. If a teacher has good experiences outdoors he will have a tendency to want to repeat the experience.

One article was found dealing with the factors involved in influencing the elementary teacher's use of an outdoor classroom. The teachers indicated that the principal was not significant in their decision to use or not use the environment.[36]

The following summary and recommendations were made: "It was found, for this specific segment of the teaching population sample, that teachers who used the out-of-doors as a teaching resource said they did so because of: (1) the value of this experience to the children; (2) recognition of the school site as a teaching area; (3) their knowledge of the application of subject matter to the out-of-doors; (4) their knowledge of how to plan and conduct outdoor experiences; (5) their personal feelings about the out-of-doors; (6) their ability to accept a change in their daily routine; (7) favorable results from previous outdoor experiences; (8) class size." Reasons for not using the outdoor instructional activities were: (1) an inability to recognize the school site as a teaching area; (2) insufficient knowledge of instructional activities that can be carried on outdoors; (3) curriculum guides and curriculum materials not available; (4) resource people not available; (5) insufficient knowledge of the application of classroom materials to the out-of-doors;

(6) insufficient knowledge of natural sciences; (7) large class size; (8) the belief that such experiences were of no value to the children.

Mirka[37] stated that there is a need for improved quality in pre-service elementary education offerings which would emphasize outdoor education methods. A need also exists for inservice programs conducted by an outdoor education specialist. Both of these programs should include: (1) application of subject matter to teaching out-of-doors; (2) what is available on a school site for outdoor teaching; (3) planning; (4) conduction of outdoor activities; (5) developing guides and materials for teaching in the out-of-doors.

The investigator has attempted to show the current status of inservice environmental education and the recommendations concerning the course content and structure of effective workshops. The research was very limited in any studies of the factors influencing teachers' development and implementation of outdoor study sites.

An attempt has been made to set the stage for the evaluation of the effectiveness of an outdoor conservation education leadership training workshop in developing competency in the educator to implement outdoor education in their schools.

FOOTNOTES

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[2]W. B. Stapp, "Inservice Teacher Training in Environmental Education," The Science Teacher, 34, 4 (April, 1976), 33.

[3]J. R. Kelly and E. P. White, "A Developmental Framework for Planning Environmental Education Programs," Science and Children, 12, 7 (April, 1975), p. 14.

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[14]W. H. Chrouser, "Outdoor vs. Indoor Laboratory Techniques in Teaching Biology to Prospective Elementary Teachers," Journal of Research in Science Teaching, 12, 1 (1975), p. 46.

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[21]Ibid.

[22]V. Rowley-Rotunno, "Project Leap: A New Approach to Teacher Education in Environmental Studies," The Social Studies, 67, 3 (May-June, 1976), pp. 132-135.

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[24]Ibid.

[25]W. B. Stapp, p. 33.

[26]Ibid.

[27]M. A. White, C. E. Raun, and D. P. Butts, "A Study of Contrasting Patterns of Inservice Education," Science Education, 53, 1 (Feb., 1969), pp. 13-19.

[28]C. R. Tillis, and D. E. LeHart, "Teachers Training Teachers--Inservice Training in Environmental Education," Journal of Teacher Education, 25 2 (Summer, 1974), pp. 160-162.

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[30]D. Kellogg, J. J. Rusch, R. M. Jones, and T. Mills, "Outdoor Education: Environmental Immersion for Oklahoma Teachers," The Science Teacher, 42 (May, 1975), p. 47.

[31]Ibid.

[32]Ibid., p. 48.

[33]M. E. Parks, "A Description and Evaluation of an Environmental Science Education Workshop for K-12 Teachers," School Science and Mathematics, 71, 9 (Dec. 1971), pp. 775-780.

[34]Ibid.

[35] K. L. Greene, "Classroom Without Walls," American Biology Teacher, 29 (March, 1967), pp. 215-216.

[36] George Mirka, "Factors Which Influence Elementary Teachers' Use of Outdoor Classrooms," The Journal of Environmental Education, 4, 4 (Summer, 1973), pp. 31-33.

CHAPTER III

DESIGN AND METHODOLOGY

Introduction

The purpose of this study is to evaluate the effectiveness of an outdoor conservation education leadership training program and to evaluate the factors that influence the implementation of an outdoor education program.

Description of the Sample

The sample consisted of those educators who enrolled in the Outdoor Conservation Education Leadership Training Program in the summer of 1976. There were 52 educators who enrolled for the program. The educators provided biographical data about themselves on the enrollment form. The educators came from 21 counties in Oklahoma. There were forty-six teachers, three principals, two graduate assistants, one undergraduate, and one curriculum coordinator. Forty-nine educators successfully completed the workshop. Thirty-seven of the 49 returned the follow-up questionnaire. Attrition was caused by the following: several had moved, one became ill and was unable to teach, and two had taken leaves of absence.

Collection of Data

Four instruments were administered during the workshop. An enrollment form was obtained from each participant prior to the workshop which contained their current teaching assignment, their reasons for wanting to participate in the workshop, and biographical data. Pre and post tests were administered to the participants. Eight months following the workshop, all participants were sent a questionnaire to determine the form of implementation they had achieved during the academic year 1976-77.

Enrollment Form

An enrollment form was constructed by the workshop staff and distributed to teachers expressing interest in the workshop in the spring of 1976. The enrollment form included the following biographical data: date of birth, current position (curriculum coordinator, building principal, or teacher), teaching assignment including grade and subject taught, number of years of teaching experience and at what grade levels, highest degree earned, the institution granting the degree, the year the degree was obtained, and the major and minor field of study.

Construction of the Pretest and Post Test

The pretest consisted of four sections. Section one was a questionnaire compiled from the special report, Environmental Education in the Public Schools which was a pilot study conducted by the research division of NEA. Portions dealing with program content and procedures were used to determine types of pupil activities and experiences, types of prior preparation used, types of follow-up activities used, and areas of study and activities included in the programs the teachers had used prior to the summer of 1976.

Section two was a check-list to determine the awareness of current curriculum materials available for environmental education. This was compiled from pretests used previously in NSF Science Awareness Workshops.

Section three was designed to determine the knowledge of resource people available to help in environmental education. This was designed by the investigator following consultation with four science educators.

Section four was designed to determine the current level of knowledge of environmental subject matter possessed by each participant. The questions were taken from Environmental Education 4-9, Instructional Objectives Exchange, and Environmental Education Activities Booklet, Oklahoma State Department of Education (Appendix A).

The post test included sections two, three, and four of the pretest (Appendix A).

Administration of the Pretest

The pretest was administered to the participants during the first week of the workshop by the investigator. The test was given in the morning at each center. The investigator visited each center on three consecutive days in order to administer the test.

Administration of the Post Test

The post test was administered on the final morning of the workshop while in residence at Camp Goddard.

Construction of the Follow-Up Questionnaire

The follow-up questionnaire was constructed with the assistance of the investigator's major adviser. The follow-up questionnaire consisted primarily of two sections. The first section was designed to determine the implementation of environmental curriculum, the type of problems the participant encountered in attempting to institute environmental curriculum, the types of assistance received, and the amount of influence the participant's involvement in environmental education had on other educators around him.

The second section was designed to determine the program content and procedures used during the 1976-77 school year. This was identical to section one in the pretest (Appendix A).

Administration of the Follow-Up Questionnaire

The questionnaire, accompanied by a letter of explanation requesting their assistance, was mailed to the participants on April 13, 1977. The time period of eight months was decided on in order to permit the teachers the maximum amount of time to implement their outdoor environmental education programs. Each questionnaire was mailed with a stamped, self-addressed envelope (Appendix B).

Follow-Up Letter

Those participants not responding after a time period of three weeks were sent another questionnaire accompanied by a letter requesting their assistance (Appendix B). A second stamped, self-addressed envelope was included wlong with the second questionnaire.

Method of Analyzing Data

All questions were answered on the instruments. The small number involved permitted the results to be hand tabulated.

Pretest and post test data on content knowledge was statistically analyzed using a paired t-test. This was done using an electronic hand calculator.

Due to the nominal nature of the data obtained on the follow-up questionnaire, the chi-square statistical test was used to determine relationships between participant characteristics and implementation of outdoor education programs.

The purpose of this chapter has been to give a general description of the design of the study.

CHAPTER IV

RESULTS OF THE STUDY

The concern of the first three chapters has been a general introduction to the study, a review of related literature, and a discussion of the design of the study.

This chapter is a presentation of the findings of the study based on the pretest, post test, enrollment forms, and the follow-up questionnaire.

The data is presented in three sections. The first section contains the statistical analyses of the hypotheses which were stated in Chapter I.

The second section contains the results of the analyses of the research questions based on the results from the follow-up questionnaires. The data in this section is presented in percentage of participant response to the items on the questionnaire that are directly related to each research question.

The third section concerns itself with a discussion of participant characteristics based on the enrollment form.

Hypothesis One

The relationship of pre-conservation program environmental content knowledge and post-conservation program environmental content knowledge is shown in Table I.

TABLE I

PAIRED t-TEST VALUES REFLECTING RELATIONSHIP OF PRE-CONSERVATION PROGRAM ENVIRONMENTAL CONTENT KNOWLEDGE AND POST-CONSERVATION PROGRAM ENVIRONMENTAL CONTENT KNOWLEDGE

Sum of Differences	Sum of Squares	No.	Variance	Mean	df	t Values
538	12,574	50	1.50	10.76	50	7.173

As indicated on Table I, the results of the paired t-test show a significant relationship. The computed t value of 7.173 called for the rejection of the null hypothesis ($P < .05$).

Hypothesis Two

The relationship of pre-conservation curriculum awareness to post-conservation program curriculum awareness is shown in Table II.

TABLE II

PERCENTAGES REFLECTING RELATIONSHIP OF PRE-CONSERVATION PROGRAM CURRICULUM AWARENESS AND POST-CONSERVATION CURRICULUM AWARENESS

Curriculum	Never Heard of It		Know About It		Have Taught It	
	Number	Per Cent	Number	Per Cent	Number	Per Cent
Pre OBIS	33	64.7	15	29.4	3	5.8
Post OBIS	2	3.9	37	72.5	12	23.5
Pre ES	38	74.5	10	19.6	3	5.8
Post ES	24	47.0	26	50.9	1	1.9
Pre Landers	41	80.3	8	15.6	2	3.9
Post Landers	32	26.7	17	33.3	2	3.9
Pre ESS	34	66.6	16	31.7	1	1.9
Post ESS	22	43.9	27	52.9	2	3.9
Pre EIS	38	74.5	11	21.5	2	3.9
Post EIS	22	43.9	28	54.9	1	1.9
Pre SCIS	27	52.9	17	33.3	7	13.7
Post SCIS	11	21.5	37	72.5	3	5.8
Pre SAPA II	43	84.3	8	15.6	0	0.0
Post SAPA II	39	76.4	11	21.5	1	1.9
Pre COPE	39	76.4	12	23.5	0	0.0
Post COPE	35	68.6	14	27.4	2	3.9
Pre ISCS	21	41.1	22	43.1	8	15.6
Post ISCS	6	11.7	37	72.5	8	15.6
Pre STEM	39	76.4	11	21.5	1	1.9
Post STEM	29	56.8	19	37.2	3	5.8

As indicated in Table II the results show a positive change in curriculum awareness between pre-conservation program and post-conservation program, therefore, the null hypothesis is rejected.

Hypothesis Three

The relationship of the types of pupil experiences provided by participants prior to and following the summer of 1976 is shown in Table III.

TABLE III

PERCENTAGES REFLECTING RELATIONSHIP OF TYPES OF PUPIL EXPERIENCES PROVIDED BY PARTICIPANTS PRIOR TO AND FOLLOWING PROGRAM

Types of Pupil Experiences	Prior to 1976		After 1976	
	Number	Per Cent	Number	Per Cent
1. Classroom experience only	7	22.5	2	6.0
2. On-site resident experience only	1	3.2	8	25.0
3. Field Trips	4	12.9	1	3.0
4. Classroom, field trips, and sequential visits	16	51.6	11	35.0
5. All types of experiences	7	22.5	12	38.7

As shown in Table III, there was a positive increase in the per cent of participants who provided experiences outside the classroom and in the per cent of participants who provided all types of experiences. Therefore, the null hypothesis is rejected based on this data.

Hypothesis Four

The relationship of pre-conservation program subject matter taught to post-conservation program subject matter taught is shown in Table IV.

TABLE IV

PERCENTAGES REFLECTING RELATIONSHIP OF PRE-CONSERVATION PROGRAM SUBJECT MATTER TAUGHT TO POST-CONSERVATION PROGRAM SUBJECT MATTER TAUGHT

Subject Matter	Pre		Post	
	Number	Per Cent	Number	Per Cent
A. Environmental				
1. Ecology	29	90.3	30	96.7
2. Biology	22	70.9	23	74.1
3. Insect Study	15	48.3	17	54.8
4. Geology	15	48.3	16	51.6
5. Botany	19	61.2	24	77.4
6. Weather study	18	58.0	19	61.2
7. Limnology	3	9.6	7	22.5
8. Zoology	18	58.0	13	41.9
9. Astronomy	11	35.4	7	22.5
10. General Science	18	58.0	19	61.5
B. Related Studies				
1. Geography	10	32.2	11	35.4
2. Mathematics	20	64.5	15	48.3
3. Social Studies	16	51.6	11	35.4
4. History	12	38.7	8	25.8
5. Chemistry	13	41.9	11	35.4
6. Physics	7	22.5	2	6.4
7. Psychology	7	22.5	3	9.6
8. Social Sciences	12	38.7	6	19.3

TABLE IV (Continued)

Subject Matter	Pre		Post	
	Number	Per Cent	Number	Per Cent
C. Applied Science				
1. Conservation	25	80.6	31	100.0
2. Forestry	9	29.0	16	51.6
3. Map and Compass	11	35.4	7	22.5
4. Health	19	61.2	11	35.4
5. Agriculture	10	32.2	8	25.8
6. Home Economics	8	25.8	0	00.0

As shown in Table IV, there was a positive change in the subject matter taught previous to the conservation program and following the conservation program, therefore, the null hypothesis which stated there was no significant difference between pre-conservation subject matter taught and post-conservation subject matter taught is rejected.

Hypothesis Five

The relationship of implementation of an outdoor education program and the participants receipt of a bachleor's degree since 1970 or before 1970 is shown in Table V.

TABLE V

CHI-SQUARE VALUES REFLECTING RELATIONSHIP OF IMPLEMENTATION TO RECEIVING A BACHELOR'S DEGREE PRIOR TO 1970 AND SINCE 1970

Degree	Implementation Yes	No	χ^2	df	Level of Significance	C
Since 1970	19	3				
			14.024	1	< 0.05	3.84
Before 1970	12	2				

The results of the chi-square test show a significant relationship of implementation to the receipt of a bachelor's degree since 1970 or before 1970 as shown in Table V. The computed chi-sqaure value of 14.024 called for the rejection of the null hypothesis, ($P < 0.05$).

Hypothesis Six

Shown in Table VI is the relationship of implementation to the participant being from a rural or urban location.

TABLE VI

CHI-SQUARE VALUES REFLECTING RELATIONSHIP OF IMPLEMENTATION TO RURAL OR URBAN RESIDENCE

Residence	Implementation Yes	No	χ^2	df	Level of Sig.	C
Rural	14	0				
			9.706	1	< 0.05	3.84
Urban	17	5				

Results of the chi-square test as indicated on Table VI show a significant relationship of location of residence to implementation. The computed chi-square value of 9.706 called for the rejection of the null hypothesis, ($P < 0.05$).

Hypothesis Seven

Shown in Table VII is the relationship of implementation of an outdoor education program to whether the participant was a male or female.

TABLE VII

CHI-SQUARE VALUES REFLECTING RELATIONSHIP OF IMPLEMENTATION TO MALE OR FEMALE PARTICIPANT

Sex	Implementation Yes	Implementation No	χ^2	df	Level of Sig.	C
Male	10	0				
			0.844	1	NS	--
Female	21	5				

As revealed in Table VII, the results of the chi-square test show a non-significant relationship between implementation and whether the participant was a male or a female. The computed chi-square value of 0.844 called for accepting the null hypothesis.

Hypothesis Eight

The relationship of implementation and whether the participants' major field of study as an undergraduate had been science or non-science is shown in Table VIII.

TABLE VIII

CHI-SQUARE VALUES REFLECTING RELATIONSHIP OF IMPLEMENTATION TO SCIENCE OR NON-SCIENCE MAJOR

Major	Implementation Yes	Implementation No	χ^2	df	Level of Sig.	C
Science	13	2	0.006	1	NS	--
Non-Science	18	3				

Results of the chi-square test as shown in Table VIII show a non-significant relationship between implementation and whether the participant had majored in science or non-science. The computed chi-square value of 0.006 called for accepting the null hypothesis.

Hypothesis Nine

The relationship of implementation of an outdoor education program to the participant's conservation concept gain or no conservation concept gain is shown in Table IX.

TABLE IX

CHI-SQUARE VALUES REFLECTING RELATIONSHIP OF IMPLEMENTATION TO CONSERVATION CONCEPT GAIN OR NO CONSERVATION CONCEPT GAIN

Conservation Concept	Implementation Yes	Implementation No	χ^2	df	Level of Sig.	C
Gain	23	4	0.0167	1	NS	--
No Gain	7	1				

As indicated in Table IX, the results of the chi-square test show a non-significant relationship between implementation and a gain in conservation concepts. The computed chi-square value of 0.0167 called for accepting the null hypothesis.

Hypothesis Ten

Shown in Table X is the relationship of implementation to the participant teaching science or not teaching science.

TABLE X

CHI-SQUARE VALUES REFLECTING RELATIONSHIP OF IMPLEMENTATION TO TEACHING SCIENCE OR NOT TEACHING SCIENCE

Assignment	Implementation Yes	No	χ^2	df	Level Of Sig.	C
Science	20	5	2.693	1	NS	--
Not Science	11	0				

As shown in Table X, the results of the chi-square test show a non-significant relationship of implementation to a participant's teaching science or not teaching science.

Hypothesis Eleven

The relationship of implementation of an outdoor education program and administrative support is shown in Table XI.

TABLE XI

CHI-SQUARE VALUES REFLECTING RELATIONSHIP OF IMPLEMENTATION TO ADMINISTRATIVE SUPPORT OR NO ADMINISTRATIVE SUPPORT

Administrative Support	Implementation Yes	No	χ^2	df	Level of Sig.	C
Yes	28	1	13.582	1	< 0.05	3.84
No	3	4				

As indicated in Table XI, the results of the chi-square test show a significant relationship of implementation to administrative shpport. The computed chi-square value of 13.582 called for the rejection of the null hypothesis, ($P < 0.05$).

Research Question Number One

What are the most common constraints encountered by teachers when attempting to implement outdoor conservation education programs?

To answer this question the information provided by the respondents to item eight of the questionnaire were used (Appendix A).

In response to item eight found on Table XII, 13.8 per cent of the participants indicated that their most common constraint was in maintenance and locating a suitable site.

TABLE XII

NUMBER AND PER CENT OF TOTAL PARTICIPANTS CATEGORIZED ACCORDING TO THE MOST COMMON CONSTRAINTS ENCOUNTERED

Constraint	Number	Per Cent
Suitable site	5	13.8
Maintenance	5	13.8
Principal	4	11.1
Vandalism	4	11.1
Other teachers	3	8.3
Lack of time	3	8.3
Class discipline	2	5.5
Money	2	5.5
New school assignment	2	5.5
Property owner's approval	1	2.7
Getting rid of poison ivy	1	2.7
Teacher militancy	1	2.7
Building a bridge	1	2.7
New superintendent	1	2.7
Stupidity	1	2.7
Weather	1	2.7
Children's reluctance to get into weeds and sun	1	2.7
Knowing where to start	1	2.7
Logistics; purchasing equip.	1	2.7
Cooperation from District Conservationist	1	2.7

Research Question Number Two

Do implementation activities increase the participation of others in outdoor education?

To answer this question the information provided by the respondents to item 15 on the follow-up questionnaire was used (Appendix A).

In response to item 15 found on Table XIII 87.0 per cent of the respondents indicated that other teachers had become interested in outdoor education as a result of their participation in the program. The total number of teachers influenced was 140. This may be informative to readers who may be responsible for inservice programs.

TABLE XIII

NUMBER AND PER CENT OF TOTAL RESPONDENTS CATEGORIZED ACCORDING TO NUMBER OF OTHERS PARTICIPATING IN CONSERVATION EDUCATION AS RESULT OF IMPLEMENTATION ACTIVITIES

Answer	Number	Per Cent	Total No. of Others
Yes	29	87.0	140
No	4	13.0	0

Research Question Number Three

Do teachers participating in training programs receive assistance from local conservation districts?

To answer this question the information provided by the respondents to item 10 on the follow-up questionnaire will be used (Appendix A).

In answering this question 86.1 per cent of the respondents indicated they had received assistance from local districts.

TABLE XIV

NUMBER AND PER CENT OF TOTAL RESPONDENTS CATEGORIZED ACCORDING TO HELP OR NO HELP FROM CONSERVATION DISTRICT

Answer	Number	Per Cent
Help	31	86.1
No Help	5	13.8

Research Question Number Four

What form of assistance do teachers who implemented outdoor conservation education programs receive"

To answer this question the information provided by the respondent's to item 11 on the follow-up questionnaire was used (Appendix A).

The most frequent types of assistance received by the respondents was consulting help, 75.0 per cent, and literature, 61.1 per cent. The other types of assistance can be found in Table XV. It may be significant to note that a total of $2300.00 was received by respondents to assist in developing sites.

TABLE XV

NUMBER AND PER CENT OF TOTAL RESPONDENTS CATEGORIZED ACCORDING TO TYPES OF ASSISTANCE RECEIVED FROM CONSERVATION DISTRICT

Type of Assistance	Number	Per Cent
Consulting	27	75.0
Literature	22	61.1
Soils Analysis	12	33.3
Money (Total $2300)	7	19.4
Purchase of Curriculum Material	5	13.8
Construction	3	8.3
Other:		
Resource People	5	13.8
Map and Plan of Area	3	8.3
Soil Auger	1	2.7
Trip	1	2.7
Core Samples	1	2.7
Shrubs and Trees	1	2.7
Seeds	1	2.7

Research Question Number Five

Do teachers receive assistance from sources other than conservation districts in attempting to implement outdoor programs?

To answer this question the information provided by the respondents to item 12 on the follow-up questionnaire was used (Appendix A).

The respondents were equally divided on this question as is indicated in Table XVI.

TABLE XVI

NUMBER AND PER CENT OF TOTAL RESPONDENTS CATEGORIZED ACCORDING TO HELP RECEIVED FROM AGENCIES OTHER THAN CONSERVATION DISTRICT

Response	Number	Per Cent
Yes	17	50.0
No	17	50.0

Research Question Number Six

What are the other sources of help teacher receive?

The answer to this question was obtained by the information provided by the respondents to item 12 on the follow-up questionnaire (Appendix A).

The greatest number of those respondents who received help from sources other than the conservation districts indicated that they received that help from individuals, 52.9 per cent.

TABLE XVII

NUMBER AND PER CENT OF TOTAL RESPONDENTS CATEGORIZED ACCORDING TO AGENCIES PROVIDING ADDITIONAL ASSISTANCE

Agency	Number	Per Cent
Individuals	9	52.9
Extension offices	7	41.1
Parents	4	23.5
Forestry people	3	17.6
Garden clubs	1	5.8
County Commissioner	1	5.8
Weyerhauser	1	5.8
Game Ranger	1	5.8
Nurserymen Association	1	5.8

Research Question Number Seven

What proportion of teachers in the program plan to continue the program they began in the academic year 1976-77?

To answer this question the information provided by the respondents to item 14 on the follow-up questionnaire was used (Appendix A).

The respondents indicated that the majority, 90.6 per cent, plan to continue programs developed this ywar as shown on Table XVIII.

TABLE XVIII

NUMBER AND PER CENT OF TOTAL RESPONDENTS CATEGORIZED ACCORDING TO PROPORTION PLAN TO CONTINUE PROGRAMS

Response	Number	Per Cent
Yes	29	90.6
No	3	9.3

Research Question Number Eight

What proportion of teachers established outdoor study sites?

To answer this question the information provided by the respondents to item 5 on the follow-up questionnaire was used (Appendix A).

As is indicated on Table XIX, 86.1 per cent of the respondents established outdoor study sited.

TABLE XIX

NUMBER AND PER CENT OF TOTAL RESPONDENTS CATEGORIZED ACCORDING TO PROPORTION ESTABLISHED OUTDOOR STUDY SITES

Response	Number	Per Cent
Yes	31	86.1
No	5	13.8

Research Question Number Nine

How many students were involved in outdoor programs established in the academic year following the workshop?

To answer this question the information provided by the respondents to item 6 on the follow-up questionnaire was used (Appendix A).

A total of 3,672 students were involved in outdoor programs established in the academic year 1976-77.

Research Question Number Ten

Do inservice programs result from teachers involvement in the workshop?

To answer this question the information provided by the respondents to item 17 on the follow-up questionnaire was used (Appendix A).

The results reveal that inservice programs did result from teachers involvement in the workshop. The greatest per cent was in the category of no inservice resulting, however.

TABLE XX

NUMBER AND PER CENT OF TOTAL RESPONDENTS CATEGORIZED ACCORDING TO INSERVICE PROGRAMS RESULTING

Response	Number	Per Cent
Yes	6	18.1
No	27	81.8

Research Question Number Eleven

Do teachers who implement receive publicity?

To answer this question the information provided by the respondents to item 18 on the follow-up questionnaire was used (Appendix A).

Publicity was obtained by 42.5 per cent of the respondents.

TABLE XXI

NUMBER AND PER CENT OF TOTAL RESPONDENTS CATEGORIZED ACCORDING TO RECEIVING PUBLICITY

Response	Number	Per Cent
Yes	14	42.4
No	19	57.5

Participant Information

A few points of interest include the fact, from Table XXII, that 42.9 per cent of the respondents are presently teaching at the grade level 7-9.

The majority, 75.6 per cent, of the respondents were female, as shown in Table XXIII. Additionally, the majority of the respondents, 94.4 per cent, are teachers, as shown in Table XXIV.

TABLE XXII

NUMBER AND PER CENT OF THE TOTAL RESPONDENTS FOR THEIR PRESENT GRADE LEVEL TAUGHT

Grade Level	Number	Per Cent
K-3	11	24.3
4-6	7	18.9
7-9	17	45.9
10-12	4	10.8

TABLE XXIII

NUMBER AND PER CENT OF TOTAL RESPONDENTS ACCORDING TO SEX

Sex	Number	Per Cent
Male	9	24.3
Female	28	75.6

TABLE XXIV

NUMBER AND PER CENT OF RESPONDENTS ACCORDING TO PRESENT POSITION

Present Position	Number	Per Cent
Teacher	34	94.4
Principal	2	2.7

A large percentage, 64.8 per cent, were science teachers, and 27 per cent of the teachers taught all subjects, as shown in Table XXV.

TABLE XXV

NUMBER AND PER CENT OF THE TOTAL RESPONDENTS CATEGORIZED ACCORDING TO SUBJECT TAUGHT

Subject	Number	Per Cent
Science	24	64.8
All	10	27.0
Math	1	2.7
History	1	2.7
Instrumental Music	1	2.7

The greatest number of participants fell into the age group 26-30, 29.7 per cent. There were participants as old as 57, as shown in Table XXVI.

TABLE XXVI

NUMBER AND PER CENT OF RESPONDENTS CATEGORIZED ACCORDING TO AGE IN YEARS

Age	Number	Per Cent
20-25	7	18.9
26-30	11	29.7
31-35	5	13.5
36-40	6	16.2
41-45	2	5.4
46-50	3	8.1
51-55	1	2.7
56-60	2	5.4

Most of the participants had a bachelor's degree as shown on Table XXVII.

TABLE XXVII

NUMBER AND PER CENT OF TOTAL RESPONDENTS CATEGORIZED ACCORDING TO THE LEVEL OF EDUCATIONAL EXPERIENCE

Level of Educational Experience	Number	Per Cent
Bachelor's	25	69.4
Master's	11	30.5

As shown on Table XXVIII, the greatest amount of respondents have from 0-5 years of teaching experience, 64.8 per cent. Beyond this number of years of teaching experience there is a trend toward a smaller percentage of respondents.

TABLE XXVIII

NUMBER AND PER CENT OF TOTAL RESPONDENTS CATEGORIZED ACCORDING TO THE NUMBER OF YEARS OF TEACHING EXPERIENCE

Years of Teaching Experience	Number	Per Cent
0-5	24	64.8
6-10	5	13.5
11-15	4	10.8
16-20	2	5.4
21-25	2	5.4

The majority of the participants had received their bachelor's degree since 1971 as shown on Table XXIX.

TABLE XXIX

NUMBER AND PER CENT OF TOTAL RESPONDENTS CATEGORIZED ACCORDING TO YEAR OF BACHELORS DEGREE

Year of Bachelors Degree	Number	Per Cent
1940-1945	1	2.7
1946-1950	2	5.4
1951-1955	1	2.7
1956-1960	2	5.4
1961-1965	2	5.4
1966-1970	10	27.0
1971-1976	20	54.0

Major fields of study were varied at the college level with the highest percentage of majors being Elementary Education, 29.7 per cent, as shown in Table XXX. Minor fields of study were diverse with the most common being chemistry, 10.8 per cent, as shown on Table XXXI.

TABLE XXX

NUMBER AND PER CENT OF TOTAL RESPONDENTS GROUPED ACCORDING TO MAJOR FIELD OF STUDY AT THE COLLEGE LEVEL

Major Field of Study	Number	Per Cent
Astronomy	1	2.7
Biology	7	18.9
Education	2	5.4
Elementary Education	11	29.7
Geography	1	2.7
Home Economics	1	2.7
Life Science	2	5.4
Math	1	2.7
Music	1	2.7
PE and Health	3	8.1
Science Education	2	5.4
Sociology	1	2.7
Vocational Agriculture	1	2.7
Zoology	1	2.7

TABLE XXXI

NUMBER AND PER CENT OF TOTAL RESPONDENTS GROUPED ACCORDING TO MINOR FIELD OF STUDY AT THE COLLEGE LEVEL

Minor Field of Study	Number	Per Cent
Chemistry	4	10.8
Earth Science	1	2.7
Education	3	8.1
English	2	5.4
French	1	2.7
History	3	8.1
Library Science	1	2.7
Music	3	8.1
Physics	1	2.7
Physical Science	1	2.7
Psychology	1	2.7

TABLE XXXI (Continued)

Minor Field of Study	Number	Per Cent
Philosophy	1	2.7
Reading	1	2.7
Science	1	2.7
Social Studies	1	2.7
Speech	2	5.4

As shown on Table XXXII, respondents were from communities of various sizes with the majority, 35.1 per cent coming from communities of less than 5,000 population.

TABLE XXXII

NUMBER AND PER CENT OF THE TOTAL RESPONDENTS CATEGORIZED ACCORDING TO THE SIZE OF THE COMMUNITY IN WHICH THEY TEACH

Community Size	Number	Per Cent
100,000 or greater	11	29.7
25,000 - 100,000	5	13.5
10,000 - 25,000	6	16.2
5,000 - 10,000	2	5.4
Less than 5,000	13	35.1

CHAPTER V

SUMMARY, FINDINGS, AND RECOMMENDATIONS

Summary

The purpose of this study has been to evaluate the effectiveness of a four-week outdoor conservation education leadership training program by investigating possible factors that influence the implementation of an outdoor education program.

Findings

Based on the findings of the study, there is evidence to support the following conclusions:

1. The null hypothesis one which stated that there is no significant difference between pre-conservation environmental content knowledge and post-conservation program environmental content knowledge was rejected. There was an increase in the scores on the post test. There is reason to believe that some sharing of information occurred during the post test as it was administered under informal circumstances. However, the large difference in most scores would indicate that this was not a significant factor.
2. The null hypothesis two which stated there would be no significant difference in pre-conservation curriculum awareness and

post-conservation program curriculum awareness was rejected as there was a definite increase in the curriculum awareness of participants following the workshop.

3. Null hypothesis three was rejected as there was a positive increase in the per cent of participants who provided experiences outside the classroom as compared to those who had provided experiences outside the classroom prior to the conservation program.

4. The null hypothesis four which stated that there is no significant difference between pre-conservation program subject matter taught and post-subject matter taught was rejected as there was a definite change toward teaching environmental subjects in the academic year 1976-77.

5. The participants who had received their bachelor's degrees after 1970 clearly implemented more conservation education programs than those who had received their bachelor's degrees before 1970.

6. Urban teachers implemented more outdoor conservation education programs than rural teachers. This seems to indicate that urban teachers feel a greater need for such programs.

7. There was no difference in implementation between male and female teachers.

8. There was no difference in implementation between science and non-science majors.

9. There was no significant difference in implementation between teachers' implementation and their conservation concepts gain.

10. There was no difference in implementation between teachers who are teaching science and those who are not teaching science.

11. There was a significant difference in implementation between those teachers who received administrative support, and those who did not receive administrative support. Those who received administrative support were more likely to implement outdoor conservation education programs.

12. The most common constraints encountered by teachers when attempting to implement outdoor conservation programs were finding a suitable site and maintenance problems.

13. A total of 140 teachers were influenced by implementation activities of participants.

14. Eighty-six per cent of the respondents had received help from their local conservation districts.

15. The most common forms of assistance received by the respondents was consulting and literature.

16. Fifty per cent of the respondents had received help from agencies other than their local conservation district.

17. Individuals comprised the largest percentage of help from agencies other than conservation districts.

18. Ninety per cent of the respondents plan to continue programs begun this past year.

19. Outdoor sites were established by 86 per cent of the respondents.

20. A total of 3672 students were involved in outdoor programs this past year.

21. Inservice programs did result from implementation activities but not in the numbers that were anticipated.

22. Teachers who implemented outdoor conservation education programs received some publicity, but the majority indicated that no publicity resulted.

Recommendations

On the basis of the results of this study and personal observations of this investigator, the following recommendations are made regarding the training program:

1. Conduct more outdoor conservation education leadership training programs in order to reach more teachers.
2. Try to involve more administrators in the training programs to help lend support to teachers who try to implement outdoor conservation education programs.
3. Continue the structure of the program basically the same as it has been including as much methodology as possible and increasing the amount of instruction in the logistics of implementation.
4. Continue conducting studies on future workshops to determine the success of the programs.
5. Administer attitudinal measures to future workshop participants to determine whether general attitudes concerning outdoor education are being altered.

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APPENDIXES

APPENDIX A

APPLICATION FOR OUTDOOR CONSERVATION EDUCATION WORKSHOP

June 14 - July 9
Oklahoma State University

PLEASE COMPLETE every item. Write "non-applicable" or "none" where appropriate.

1. Name
Mr. Mrs. Miss
(encircle one) ______________________________
Last First Middle

2. a. I am confident that I will attend the 4-week Conservation Education program.

   b. I am not confident that I will attend the 4-week program, and wish to be placed on standby until my plans are confirmed.

3. I have confirmed an Oklahoma Conservation Commission Scholarship
   Yes No

   If answer to #3 is yes:
   Name of local Soil Conservation Service representative and district providing your Oklahoma Conservation Commission Scholarship

   ______________________ ______________________
   District Representative

4. Check the kind of housing you wish for June 28-July 9 at Goddard.

   ___ 1. Camp Goddard cabin assignment
   ___ 2. Camp or tent out (1-2 miles from Goddard)
   ___ 3. Local motel or resort cabin (participant must reserve)

5. Residential address ______________________ Home Phone ______
   No. & Street area code

   ______________________ ______
   City Zip Code Number

6. Date of birth ______________________

7. School where employed ______________________ ______________________
   Name Name of School System

   ______________________ ______________________
   School address (zip code) School phone (area code)

8. Mailing address you wish used ________home________school (please check one)

9. Current Position: Curr. Coordinator ____ Building Principal ____
Teacher ____

10. Future Teaching Assignment (List expected major responsibility first)

	Grade	Subject
	______	______
	______	______
	______	______

11. Number of years of teaching experience (Please be specific)
K-3 ______ 4-6 ______
7 ______ 8 ______ 9 ______
10 ______ 11 ______ 12 ______

Total years teaching experience ______________________

12. Highest degree earned ____ no degree ____ bachelor's ____ masters
____ doctor's

13. Bachelor's degree ______________________ ______ ______
granting institution year major field

______
minor field

14. Do you currently have an Outdoor Environmental Education curriculum?

15. I am interested in:

____ 1. Planning an Outdoor Education Center for public school students
____ 2. Planning and implementing an Outdoor Education Center for public school students.

16. Have you had any previous experience with Outdoor Environmental Education training programs? Please explain/describe if Yes ______________________

____

____

17. Your main reason for participating in the Conservation Education Workshop

____

____

____

Name ______________________

PRE-POST ASSESSMENT

Check the following items that you have included in your curriculum this past year:

I. Types of Pupil Experiences

_____1. Classroom experience only
_____2. On-site resident experience only
_____3. Field trips
_____4. Classroom, Field trips, and Sequential visits
_____5. All types of experiences

II. Types of Prior Preparation Used

_____1. Discussions and reading in class
_____2. Audiovisual presentation in class
_____3. Visits to classroom by resource persons
_____4. Other

III. Types of follow-up activities used

_____1. Oral discussions and reports
_____2. Examination, identification and use of specimens collected
_____3. Displays and exhibits
_____4. Written reports and essays
_____5. Films, slides, or transparancies
_____6. Reading to extend experiences
_____7. Art activities
_____8. Action program (ie. conservation project)
_____9. Structured lessons
_____10. Sound recording
_____11. Drama
_____12. Other

IV. Areas of Study and Activities Included in Program

A. Environmental
_____1. Ecology
_____2. Bioloby
_____3. Insect study
_____4. Geology
_____5. Botany
_____6. Weather study
_____7. Limnology
_____8. Zoology
_____9. Astronomy
_____10. General Science

B. Related studies
_____1. Geograph
_____2. Mathematics
_____3. Social Studies
_____4. History
_____5. Chemistry
_____6. Physics
_____7. Psychology
_____8. Social Sciences

C. Applied Science

_____1. Conservation
_____2. Forestry
_____3. Map and Compass
_____4. Health
_____5. Agriculture
_____6. Home Economics

D. Sports

_____1. Recreation
_____2. Physical Education
_____3. Hunter Safety
_____4. Angling and Casting
_____5. Canoeing and Water Safety

E. Arts

_____1. Art
_____2. Creative Writing
_____3. Reading
_____4. Music

PRE-POST ASSESSMENT

I. CURRICULUM

Place a check mark ( ) in the column that describes your familiarity with the programs listed.

	I have never heard of it	I know about it	I have taught it
1. OBIS			
2. ES Cards			
3. Lander Cards			
4. ESS			
5. EIS			
6. SCIS			
7. SAPA II			
8. SPIES			
9. COPE			
10. ISCS			
11. STEM			

II. RESOURCE PEOPLE

Fill the blank with the correct resource people to handle the following needs:

1. Films on Wildlife in Oklahoma____________________

2. Eggs for an embryology study____________________

3. Testing for soil acidity____________________

4. Soil profiles for your school ground____________________

5. Student booklets on Exploring Your Environment____________________

6. A study of weather maps____________________

7. A study of rocketry____________________

8. Bees for an insect study____________________

III. SUBJECT MATTER

1. In the space next to the name of the organism make a "P" if it is a producer, a "C" if it is a consumer, and a "D" if it is a decomposer.

____a. a flower
____b. mushrooms
____c. a mouse
____d. bacteria
____e. a frog

2. Mark an "X" next to the beginning source of energy for each activity.
A. A boy running
____a. the hamburger he had for lunch
____b. a cow eating alfalfa
____c. the alfalfa eaten by the cow

B. Corn on the cob growing
____a. rich soil
____b. the sun overhead
____c. rainfall

C. Coal powered engine pulling a train
____a. the pieces of coal
____b. sunshine hundreds of thousands of years ago
____c. wood of ancient trees under high pressure

3. Write "T" in the space next to each sentence that is true, and "F" next to each sentence that is false.
____a. Photosynthesis is the process in which plants get the sun's energy and change it into food for living organisms.

____b. The simplest food product of a plant's activities is a protein.

____c. When an animal eats plants, he is getting organic carbon which will be burned to help the animal make energy and grow.

____d. In respiration the same carbon that made the food is changed into carbon dioxide which can be used by the plant again.

____e. Animals breathe out oxygen for use by other organism.

____f. Plants use up carbon dioxide during the process of photosynthesis.

____g. Plants carry on respiration just like animals do, and in the process they both release carbon dioxide and use up oxygen.

____h. Plants use carbon dioxide as a nutrient, whereas animals do not.

4. These sentences describe changes in the water cycle that might take place. Mark an "X" in the space next to the answer that describes what would happen to the surroundings after the change.

A. The climate changes so much that water no longer evaporates from the ocean.

____1. The ocean will become saltier.
____2. The ocean will begin to dry up.
____3. Nothing will happen to the plant life in the ocean.
____4. Fish in the ocean will adapt to the change in the amount of salt or die out.

B. The direction of a river is changed to go to an area with more people.

____1. Soil in the river bed would become moister.
____2. Small fish will be replaced with larger fish.
____3. The land along the river bed will be able to grow fewer plants.
____4. There will be more plants like reeds and algae.

C. Trees are removed in an area so that it can no longer serve as a watershed.

____1. There will be much erosion and less life in the area.
____2. More water will build up in the soils and plants of the area.
____3. Less rain will be needed for good growth to occur.
____4. The water will drain into a nearby basin as usual.

5. In the space beneath the sentence, construct a food chain. For example: "A cat killed a bird which had just eaten a dragonfly" would be drawn:

Dragonfly--------------------Bird-------------------Cat

Write the name of the organism which must be eaten first to the left of a line, the name of the organism that eats it just to the right, draw an arrow to it, and continue this process until all the organisms have been included in the food chain.

A. The cow was fed pure grain which made the steak eaten by the man taste good.

B. The mouse was eating a little piece of cheese when the cat, who had a bad case of fleas, pounced on it.

C. The hunter shot a bear which lived near a stream and fed on trout. The trout leaped out of the stream to get plant eating insects.

6. Place a "T" in the space next to the statement if it correctly describes the interaction between the soil and biotic environment, and an "F" next to the statement if it does not.
   ____1. Soil animals serve as cultivators of the soil and create space for air and water absorption by their burrowing and digging.
   ____2. Plants do not build soil, they only use up its components.
   ____3. The desert has more humus than the forest because of the larger number and types of organisms living in the desert.
   ____4. Animals often mix the humus of the surface into the soil and thus distribute nutrients throughout the soil.
   ____5. "Litter" is the name given to dead plant and animal material which becomes the top layer of the soil as it decomposes.

7. Below are some ways that organisms have adapted to their environment. In each space, write the letter of the biologic needs which are met by each adaptation, according to the following key:

   A. obtaining of food
   B. protection from predators and/or parasites
   C. reproduction
   D. none of the above

   ____1. walking stick shaped like a tree branch in a forest
   ____2. stinging cells of a sea anenome in a tidepool
   ____3. bright colored feathers of male birds in forest
   ____4. hard scales on a lizard in the desert
   ____5. small fish with huge eyes in the ocean

8. Mark an "X" next to the statements which correctly describe an acceptable standard for drinking water.

   ____1. Water must be free from sediment, odor, taste, and color.
   ____2. Water must be 100 per cent pure.
   ____3. Water must contain no harmful bacteria and viruses.
   ____4. Water must come from an underground source.
   ____5. Water must not be reused.
   ____6. Water must contain no bacteria and viruses.

9. Place an "M" next to the item if it is an air polluting substance or source which is man caused, an "N" next to the item if it is natural, and an "E" next to the item if it can be either man-caused or natural.
   ____1. volcanoes
   ____2. oil refinery
   ____3. outer space cosmic dust
   ____4. nitrous oxides from automobiles
   ____5. pollen
   ____6. smoke from a forest fire
   ____7. sulfur dioxide from copper smelters
   ____8. radioactive fall out
   ____9. carbon monoxide
   ____10. evaporating salt from oceans

10. In each of the following items, place an "R" next to the energy source which is renewable and an "N" next to the energy source which is non-renewable.

____1. hydorelectric power
____2. coal-produced electricity
____3. geothermal energy
____4. wood
____5. gas/oil
____6. solar energy
____7. wind energy
____8. nuclear energy

11. Place and "X" next to those places which are either likely to cause flooding or to be flooded.

____1. heavy urban development on the sides of hills above a flood plain
____2. homes built on the delta of a river
____3. steep, but heavily forested grassy slopes next to a town
____4. development of houses within a river valley

12. Place an "X" next to the statements which correctly describe land use practices in agriculture.

____1. It is best to plant seeds in rows running up and down hills rather than along their sides.
____2. Topsoil is lost when huge fields are plowed and planted with one crop and there isn't enough rain for those plants to survive to hold the soil in place.
____3. It is a good idea to plant different crops in the same field from year to year to help retain the proper mineral content in the soil.
____4. Adding fertilizer restores chemical balance and humus to a field where crops have been growing.
____5. Many animals grazing in a certain area can cause erosion of the soil.

13. Place an "X" next to the alternatives which correctly identify the treatment of waste water in the named stage of the sewage treatment process.

A. Primary treatment (select two options)

____1. Water filters over a bed of rock.
____2. Filtering screens separate out rags, sticks.
____3. Suspended particles settle to the bottom.
____4. Water is chlorinated.

B. Secondary treatment (select two options)

____1. Filtering screens separate out rags, sticks, and large objects.
____2. Nitrogen is removed by blowing air through sewage.
____3. 90 % of organic pollutants are consumed by bacteria.
____4. Water filters over a bed of rocks.

C. Advanced treatment (select two options)
____1. Soil, rock, and sand settle to the bottom.
____2. Phosphate is removed with the help of lime.
____3. Water filters through coarse stones.
____4. Nitrogen is removed by blowing air through the water.

14. Mark an "X" next to those alternatives which correctly describe either the causes or effects of water pollution in the particular situation which is described.

A. The causes of eutrophication in a shallow natural pond during the summer are:
____1. long periods of bright sunshine
____2. build-up of dead algae once they have "bloomed"
____3. build-up of mercury
____4. not enough oxygen in the water

B. The effects on the water of a river receiving untreated sewage from a city are:
____1. a change and decrease in the kinds and numbers of fish in the water
____2. no change in the recreation in the river
____3. an increase in oxygen in the river
____4. a possible increase of disease causing bacteria and viruses

C. The effects on a river of factory-discharged water containing mercury or other metals are:
____1. a build-up of the metal in the water and the organisms of the water
____2. an increase in the number of bacteria and thus more break-down of other sewage
____3. a disease in organisms, including humans, which receive too much of the metal
____4. a coloration of the water according to the color of the metal

D. The causes of pollution of rivers receiving run-off from agricultural activities are:
____1. mercury and chromium from machinery
____2. fertilizers that increase nutrients so that algae grow and use up oxygen
____3. herbivores and pesticides sprayed on plants

15. Use the following code to indicate the correct word for the definitions:

L = Litter
D = Duff
H = Humus

____1. partially decomposed organic matter - compacted
____2. identifiable dead things on the surface
____3. almost completely decomposed non-identifiable organic matter

16. Using the following pH scale, indicate the following plants and animals:

Neutral
Acid 1 2 3 4 5 6 7 8 9 10 11 12 13 14 Alkaline

____1. Bass
____2. Snails
____3. Trout
____4. Camillias, Azaeleas, and Spruce
____5. Orange trees, sagebrush
____6. Maples, Peaches, Carrots, Lettuce
____7. Pines, firs, oaks

17. Fill in the correct parts per million (ppm) of dissolved oxygen required by the following organisms:

____1. Trout spawning
____2. Salmon
____3. Bass
____4. Crappie

18. Place an "X" beside the location you would find the following organisms: stonefly, caddisfly, daphnia, planaria, cyclops, strider

____1. lake
____2. ocean
____3. pond
____4. river
____5. stream
____6. mountain

19. Place an "X" by the biotic components of an ecosystem:

____1. green plants
____2. herbivores
____3. carnivores
____4. consumers
____5. mushrooms
____6. air

20. Place an "X" by the abiotic components of an ecosystem:

____1. mushrooms
____2. green plants
____3. air
____4. rocks
____5. leaves
____6. water
____7. herbivores

21. Use the following code to indicate where you will find the following organisms: L - Lithosphere, H - Hydrosphere, B - Biosphere, A - Atmosphere

____1. Bird
____2. Worm
____3. Planaria
____4. Bobcat
____5. Lichen

22. Classify the following rocks using the code:

    S - Sedimentary
    I - Igneous
    M - Metamorphic

____1. quartz
____2. gneiss
____3. granite
____4. limestone
____5. shale
____6. marble

23. Classify the three horizons identified below using the following code:

    A - topsoil
    B - subsoil
    C - substratum

____1. Zone of accumulation
____2. Zone of decomposed material
____3. Zone of leaching

24. Mark with an "X" the events listed below that can produce condensation nuclei:

____1. forest fire
____2. volcanic eruption
____3. wind erosion of soil
____4. sea-salt spray
____5. chimneys

25. Mark with an "X" those items below that would be high in eutrophic lakes:

____1. nutrient recycling
____2. productivity
____3. large numbers of aquatic species
____4. many species

1. Name:____
   Last   First   Middle

2. Residential Address:______________________________________
   No. & Street

   ____
   City & Zip

3. Current teaching assignment (list major responsibility first)

Grade	Subject
________	______________________
________	______________________
________	______________________
________	______________________

4. School where employed:

   ____
   Name   System

5. Have you established an outdoor site? ________Yes; ________No

   If not, do you plan to do so in this school year? ________Yes; ________No

6. How many students are involved in using the outdoor site? ________

7. Estimate how much time your classes are taught out of class: ________Times per week, ________Times per month, ________Times since summer of 1976.

8. What were the biggest problems you had to overcome in order to establish an outdoor site or that may have kept you from establishing an outdoor site?

   a.

   b.

9. Have you spent more time this year in environmental education then you did the previous academic year? ________Yes; ________No

10. Have you received assistance from your local conservation district other than the scholarship? ________Yes; ________No

11. If yes, check the form of assistance you received:

   _____Consulting service

   _____Soils analysis

   _____Money (Amount $_______)

   _____Construction (ponds, nature trails,

   _____Purchase of curriculum material

   _____Literature (brochures, maps, etc.)

   _____Other (explain)

12. Have you received assistance from other agencies? ________Yes; ________No

If yes, check the appropriate blank:

_____Garden Clubs _____Civic Clubs

_____Parent groups _____Individuals

_____Extension Offices _____Other (explain)

13. What kind of assistance did you receive? ______Consultant, ______Funds, ______Amount, ______Equipment and or materials, ______Printed materials.

14. Do you plan to continue your program next year? ________Yes; ________No

15. Have other teachers in your school become interested in Conservation Education through your program? ________Yes; ________No

If so, how many? ________

16. Has your school administration been supportive? ________Yes; ________No

17. As a result of your participation, have in-service teacher training classes resulted? ________Yes; ________No

18. Have you received any publicity relative to your involvement in outdoor education? ________Yes; ________No

19. Check the types of pupil experiences you have included in your classes.

____1. Classroom experience only

____2. On-Site resident experience only (out of doors on your school grounds)

____3. Field trips (away from school grounds)

____4. Classroom, field trips, and sequential visits

____5. All types of experiences

20. Check the types of follow-up activities used:

____1. Discussions and oral reports
____2. Examination, identification and use of specimens collected
____3. Displays and exhibits
____4. Written reports and essays
____5. Films, slides, or transparencies
____6. Reading to extend experiences
____7. Art activities
____8. Action program (i.e. conservation project)
____9. Structured lessons
____10. Sound recording
____11. Drama
____12. Other (please explain)

21. Areas of Study and Activities Included in Program

A. Environmental

_____1. Ecology
_____2. Biology
_____3. Insect Study
_____4. Geology
_____5. Botany
_____6. Weather study
_____7. Limnology
_____8. Zoology
_____9. Astronomy
_____10. General Science

B. Related Studies

_____1. Geography
_____2. Mathematics
_____3. Social Studies
_____4. History
_____5. Chemistry
_____6. Physics
_____7. Psychology
_____8. Social Sciences

C. Applied Science

_____1. Conservation
_____2. Forestry
_____3. Map and Compass
_____4. Health
_____5. Agriculture
_____6. Home Economics

D. Sports

_____1. Recreation
_____2. Physical Education
_____3. Hunter Safety
_____4. Angling and Casting
_____5. Canoeing and Water Safety

E. Arts

_____1. Art
_____2. Creative Writing
_____3. Reading
_____4. Music

May 6, 1977

Summer 1976 Conservation Education Leadership Training Program Participants

Ted Mills

Absolutely the last set of responses we will ever ask of you!

Please take the time to fill out the form and return it ot me in the enclosed self-addressed envelope. We will be pleased to share the results with you.

You have been so cooperative in responding to our inquiries, I want to reiterate that the enclosed survey form will be the last. The group is interested in gathering additional data to determine the outcome of the summer, 1976 program.

Thanks.

OKLAHOMA STATE UNIVERSITY

MEMORANDUM

DATE April 13, 1977

TO Summer, 1976 Conservation Education Leadership Training Program Participants (Also know as the Oklahoma Tick and Chigger Blood Donors Association)

FROM Ted Mills

SUBJECT The last set of responses we will ever ask of you!

You have been so cooperative in responding to our inquiries I want to reiterate that the enclosed survey form will be the last. The group is interested in gathering additional data to determine the outcome of the summer, 1976 program.

Please take the time to fill out the form and return it to me in the enclosed self-addressed envelope. We will be pleased to share the results with you.

Thanks.

VITA[2]

Jane Strother Burris

Candidate for the Degree of

Master of Science

Thesis: AN EVALUATION OF AN OUTDOOR CONSERVATION EDUCATION LEADERSHIP TRAINING PROGRAM

Major Field: Curriculum and Instruction

Biographical:

Personal Data: Born in Ada, Oklahoma, October 28, 1939, the daughter of Maudie and Melvin Strother.

Education: Graduated from Will Rogers High School, Tulsa, Oklahoma, in May, 1957; received Bachelor of Science degree in Education from University of Tulsa in 1970; attended Oklahoma State University from September, 1975 to July, 1977; completed the requirements for Master of Science degree at Oklahoma State University in July, 1977.

Professional Experience: Elementary science teacher for Tulsa Public Schools, Independent District Number 1, Tulsa, Oklahoma, 1970-1977; metric consultant for Tulsa Public Schools, Tulsa, Oklahoma, 1974-1977; metric consultant for Oklahoma State Department of Education, Oklahoma City, Oklahoma, 1976-1977.

Professional Organizations: Member of the Tulsa Science Teachers Association, Oklahoma Science Teachers Association, National Science Teachers Association, Tulsa Classroom Teachers Association, Oklahoma Education Association, National Education Association, Board of Directors, Oklahoma Science and Engineering Fair.