

The Effect of an Outdoor Education Program
on Student Attitudes and Academic Grades

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Robert J. Mak
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Abstract

The purpose of this study was to measure the effectiveness of an outdoor education process in changing attitudes of students, increasing their academic grades in environmental education and to determine the positive attitudes achieved by students involved in an informal educational experience. Changes in self-concept and attitudes towards school, teachers, and the environment were examined within and between a group of students experiencing regular classroom instruction and a group of students experiencing instruction out-of-doors. The study also examined the cognitive learning in environmental education between the same two groups. The last part of the study measured the positive attitudes of students involved in an informal outdoor education experience and compared them to a group of students involved in a formal, structured outdoor education experience.

Fifty students were involved in the study of the changes in attitudes and cognitive learning. These were students taking Biology 200 at Sisler High School in Winnipeg. The treatment group consisted of twenty-five students and the control group was made up of twenty-five students. The treatment group received their instruction in the classroom. Both groups were pre- post-tested for changes in attitudes towards themselves, school, teachers and the environment, before and after experiencing the appropriate teaching processes. Both groups

were also pre- post-tested on environmental knowledge. The informal group was made up of twenty Grade X, XI, XII students who were members of an outdoors club. They were given an attitude test and compared to the treatment group.

The survey of student attitudes was designed to measure self-concept, and attitudes towards school, teachers and the environment. A cognitive test was designed to measure environmental knowledge.

The results indicate that there is no significant difference in changes in attitudes between groups experiencing classroom instruction and those experiencing instruction in the outdoors. The outdoor instruction did significantly improve cognitive learning of environmental knowledge when compared to the increase in environmental knowledge experienced by the group taught in the classroom. Those students involved in an informal outdoor education program exhibited positive self-concepts, and attitudes towards school, teachers, and the environment.

Acknowledgements

I would like to thank Professor Stu Seim, chairman of the thesis committee, for his help, guidance and patience in completing this study. The writer is also indebted to Dr. Murray MacPherson and Dr. Phil Husby for their participation on the thesis committee.

Dedication

This thesis is dedicated to my son, Darren. It is hoped that his education will be exciting, challenging and based on the philosophy of outdoor education.

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CHAPTER I

Introduction

A review of the literature has shown that there is a need to provide empirical data concerning how an outdoor education program, as part of the curriculum, can affect concepts, attitudes and emotions.

Robert and Sonia Vogl (1974, p. 54), in their research analysis of outdoor education in relation to environmental quality, found that George W. Donaldson (1972), in his paper "Research in Outdoor Education," stated that there was a need in the following areas:

Empirical studies of exemplary design applied to large populations;

Studies which distinguish between cognitive and effective domains;

Studies of the interests and attitudes of learners; individual growth, especially self-concept; the nature of learning in non-resident programs; the unique needs of inner-city youth in outdoor education. (pp. 9-10)

In addition, authors such as Miller (1972, p. 104), Blackwood (1972, p. 128), Pullias (1972, p. 12), and Smith (1972, p. 12) suggest that by providing a direct, participatory program, the acquisition of knowledge and skills will be enhanced.

Teachers, in providing residential and non-residential experiences for students, have been concerned that these experiences are educationally sound and provide for the growth of the students involved. The teachers' evaluations of these programs have been based on personal, subjective observations which may allow personal biases to creep in. Expansion of school curricula and content has placed a premium on time allocation within the school day. As teachers and administrators become more involved with school programming and are deemed more responsible and accountable for programming, it is necessary for them to provide empirical justification for changes in both the program and the teaching process. Outdoor education is a process that requires this empirical justification, as it tends to place more of a demand, than in-class experiences, on teacher-student school time, teacher preparation time, and education funding.

This study examined (a) the attitudes of students toward themselves, their teachers, the school and their environment, (b) the capacity of an outdoor education program to increase their knowledge of environment problems and management, (c) the capacity of an outdoor education process to change the attitudes of students toward themselves, their teachers, the school and their environment.

Need for the Study

An informal survey of camping and outdoor experiences of Sisler High School students in Grades X, XI, XII had been

made for three years (1971, 1972, 1973). This informal survey of the outdoor recreation skills and knowledge of the students was undertaken to determine (a) the experiences and skills the students possessed in outdoor recreation, (b) the training and its source that the students had in outdoor recreation, (c) the environmental and survival knowledge students possessed, and (d) the attitude of students toward their natural environment. A total of 329 students were surveyed.

The questionnaire portion of this informal survey is found in the Appendix A, with the percentage responses to each item. Following is a brief summary of information obtained from this survey.

The informal survey was undertaken to gather information on the camping and outdoor experiences of the students at Sisler. The researcher believed that it was necessary to gather information on the knowledge and experiences of the students, so that a research program could be established. This was necessary to avoid duplication of the content taught during the research study.

It was found that 79% of the students sampled do go camping; 56.5% with their families and 81.5% with friends. In addition, 70.5% stated that they would like to learn more about camping. This percentage indicates that many students in Sisler are experiencing a camping situation.

Part B of the survey covered boating and swimming experience. The percentage owning boats was 19.7%. Of that

19.7%, 55.3% owned power boats.

In response to swimming ability, 79.5% of the students felt that they could swim reasonably well or better and this corresponds to the 77.5% that have taken swimming lessons.

Part C of the survey covered hunting and firearm safety. Thirty percent of the respondents hunted, but only 17.3% had taken a hunter safety program.

Part D was a questionnaire of outdoor lore, testing both knowledge and attitude. Seventy-five percent of the students answered the questions correctly. As a result, it can be assumed that the majority of students surveyed had a basic knowledge of outdoor lore and a positive attitude toward the environment.

The results of the informal survey indicated that there was an interest by the students in participating in outdoor activities. At the time of the informal survey, the researcher was also incorporating the process of teaching outside the classroom into the regular classroom procedures. It was noticed that interest in the academics seemed to be improving, and there was an increased enthusiasm and participation on the part of the students. Based on this information, the researcher decided that a formal research study of the effectiveness of an outdoor education program related to student attitudes and learning was necessary.

Definition of Terms

Outdoor education. "is a means of approaching

educational objectives through guided direct experience of the outdoors, using as learning material the resources of the environment." (National Association for Outdoor Education, Great Britain, Advertisement Brochure).

Environmental education. "is aimed at producing a citizenry that is 'knowledgeable' concerning the bio-physical environment and its associated problems, aware of how to help solve these problems, and motivated to work toward their solution." (Environmental Education, 1972).

Attitude. "a readiness to react toward or against some situation, person or thing, in a particular manner." (Good, 1959).

Effect, simple. "the effect of an experimental factor under controlled conditions, that is, with other factors held constant." (Good, 1959).

Self-concept. The view a person has of himself. "Those parts of the phenomenal field which the individual has differentiated as relatively stable and definite parts or characteristics of himself." (Good, 1959).

Statement of the Problem

The purpose of this study was to measure the effectiveness of an outdoor education process in changing attitudes of students and increasing their academic grades in environment education. The study also examined the positive attitudes achieved by students involved in an informal educational experience.

Statement of Hypotheses

General Hypothesis I

Students taught environmental education utilizing outdoor education procedures, will show no significant change in attitude when compared to students taught environmental education in the classroom.

Specific Hypotheses

- a. Students taught environmental education utilizing outdoor education procedures, will show no significant change of attitude toward their school when compared to students taught environmental education in the classroom.
- b. Students taught environmental education utilizing outdoor education procedures, will show no significant change in their self-concept when compared to students taught environmental education in the classroom.
- c. Students taught environmental education utilizing outdoor education procedures, will show no significant change of attitude toward their teachers when compared to students taught environmental education in the classroom.
- d. Students taught environmental education utilizing outdoor education procedures, will show no significant change of attitude toward the environment

when compared to students taught environmental education in the classroom.

General Hypothesis II

Students taught environmental education utilizing outdoor education procedures, will show no significant improvement in academic scores in biology class when compared to students taught environmental education in the classroom.

General Hypothesis III

Students taking part in an informal outdoor experience will not exhibit a positive self-concept.

General Hypothesis IV

Students taking part in an informal outdoor experience will not exhibit a positive attitude toward their school.

General Hypothesis V

Students taking part in an informal outdoor experience will not exhibit a positive attitude toward their environment.

General Hypothesis VI

Students taking part in an informal outdoor experience will not exhibit a positive attitude toward their teachers.

Design of Study and Data Collection

The study involved three groups of students. The treatment and control groups were made up of Biology 200 students and the informal group was composed of Grades X, XI, XII members of an Outdoor Club. The study was limited to the teaching of environmental concerns through the process of outdoor education. The study attempted to measure changes in attitude in students toward their school, teacher, themselves and the environment and disregard other attitudinal changes that might have occurred.

In the portion of the study involving a change of attitude and a change in academic scores, two groups of students were considered - a treatment group and a control group. The treatment and control groups were Grade XI Biology 200 students at Sisler High School. The third group of students involved in the study were members of an Outdoors Club at Sisler. This represented students experiencing an informal outdoor education program and was made up of Grade X, XI and XII students who voluntarily applied for membership in the club. This third group were given the attitude test for comparison to the treatment group.

The control group consisted of 25 students--12 males, 13 females. The treatment group consisted of 25 students--8 male, 17 female. The class groups were heterogeneous, with placement being allocated by computer. The criteria for

being placed in either class were (a) desire to take Biology 200, (b) ability of computer to align the student's timetable to take the subject timetable. Both classes were parallel timetabled and final placement of students to either class was arbitrary, with the limitations of attempting to balance class sizes. There were no pre-requisites for the course and no attempt was made to channel students into the program.

The study used a pre-test, post-test design of knowledge and attitudes. This pre-test, post-test design was used to eliminate the entrance level of the group of individuals in the study. It was felt that this was necessary because of the diverse backgrounds of the students as was shown in the informal survey reported earlier. The content for the study was based on the ecology section of Biology 200 - B.S.C.S. Blue Version.

The treatment group was given a pre-test of attitudes and a pre-test of environmental knowledge. This group then started a program of environmental education for a period of two school cycles--12 teaching days, fourteen 37-minute periods. This included field trips to the Delta Waterfowl Research Station, Birds Hill Park and LaBarriere Park. An early morning session of canoe instruction was given at the Centennial Pool. During the regular class periods, the school site was used to collect samples of soil, terrestrial/aquatic flora and fauna, and to evaluate the influence of man on his environment. A bicycle trip into the neighborhood was used

to acquaint the students with the complexity of the environment. At the end of the program, a post-test of attitude and environment knowledge was administered.

The control group was given the pre-test of attitudes and environmental knowledge. They then began a program of environmental education, covering the same concepts, but remained inside the classroom. The control group performed the same experiments in the laboratory as the treatment group did outdoors. They were not taken on field trips, but were shown slides that were taken during the field trips of the treatment group. Precautions were taken to prevent the students of the treatment group from appearing in the slides. The control group received the same theory that the treatment group received. At the end of the program, the control group wrote the same post-test.

Assumptions

The following assumptions were made in designing the research with regard to this study and the testing device:

1. The sample is assumed to be a random heterogeneous group representative of Grade XI Biology 200 students.
2. Content was presented to the control and treatment groups in a similar manner with regard to quality, quantity and enthusiasm.
3. The instructor exhibited no bias toward a particular teaching method.

Limitations of the Study

The sample may not be representative of a larger school population, as the student's desire to take biology may indicate a prior opinion or interest in ecology and the environment. The members of the Outdoor Club may carry this same bias.

The time selected for the study may prejudice the study, as it started at the beginning of May, 1974. With the onset of warm weather, the students may be more receptive to the subject of the study.

The time period selected was near the end of the school term. As a result, student interest in academic subjects might not be as high as it was at the beginning of the school year.

The length of the study was limited, as the students were dismissed from classes on June 7, 1974.

Suitable standardized tests were not available for the attitude study or the environmental program. In an attempt to achieve a reliable test, several standardized tests were used to provide items that could be collated to produce a test that would fit the needs of the study. In areas where suitable standardized tests were found to be deficient, the researcher constructed items to complete the test.

CHAPTER II

A SURVEY OF THE RELATED LITERATURE

Introduction to the Literature

The current literature related to outdoor education and environmental education, as they relate to the individual child, is included in this literature review. This review is divided into two parts: (a) descriptive literature describing how authors define outdoor education and what processes of change they attribute to outdoor education, (b) evaluative literature describing empirical studies performed on outdoor education programs.

Outdoor education in the literature is described as a teaching process that can attain the perceived needs of the individual child. Outdoor education is viewed as a process whereby educational goals can best be achieved and a high interest factor retained by the student. A change in an individual's attitude toward himself, his environment and his peers is also reported. The related literature discerns the process involved in outdoor education and attempts to measure the effects of the process on students, but the research does not attempt a direct measurement on the students themselves. A reliance is placed on observations made by parents, teachers, and camp counsellors.

Descriptive Literature

Molly Harrison (1970) illustrated "what education is about,"

1. . . . there is a growing concern to widen children's horizons.
2. . . . there is a growing concern that teaching should relate to the individual and to the late twentieth century.
3. . . . there is a growing realization that learning is an active process for the young and not a mere passive listening.
4. . . . there is a growing concern that teaching should no longer be treated in watertight compartments.
5. . . . there is growing concern that education should help young people to cope with an age of increased leisure.

Most authors of outdoor education and environmental education agree that outdoor education can meet these needs. Peggy Miller (1972) states that outdoor education is the "non-human change agent" that has made "significant changes in education" (p. 103) more quickly than other change agents have.

If we accept MacKenzie's (1975) list of needs of the individual and society, which are as follows:

Needs of the Individual

Interpersonal relationships - social harmony
 Physical fitness and health
 Positive self-image
 Spiritual harmony
 Intellectual growth and understanding
 Adventure, challenge, responsibility, achievement,
 motivation, feelings of being needed
 Leisure, recreation, aesthetics

Needs of Society

A healthy social and cultural environment with sufficient stability, structure, and security
 Physically, mentally and spiritually healthy human resources
 A healthy natural environment. (p. 156).

then we should accept his premise that outdoor education can "contribute vitally and significantly" to educating the child because "it offers the whole outdoor natural environment as a medium for education, and is limited by neither time nor space."

Maslow (1954, p. 2) has written that the human species has basic needs. He calls these "species-wide" needs, and identifies them as

- need for food
- need for safety, protection and care

- need for gregariousness and for affection - and -
 love relations
- need for respect, standing and status, with conse-
 quent self-respect
- need for self-actualization or self-fulfillment
- need for sheer knowledge and understanding
- aesthetic needs

To meet the needs of both the individual and society as outlined by MacKenzie and Maslow above, we should examine the educational goals and how they can be attained in the outdoors, as proposed by Smith et al (1972, p. 31).

Educational Goals and Means in the Outdoors

GOAL

MEANS IN THE OUTDOORS

To develop the full potential of the individual

through optimum exposure to and involvement with the natural environment.

To develop knowledge, skills, attitudes and appreciations for the constructive and creative use of time

through exposure to outdoor interests and instruction in outdoor sports and component skills.

To promote the development of social relations and individual responsibility

through group living experiences particularly in resident outdoor education, where there are unique opportunities for student-teacher planning and participation in the camp community.

To promote the development of civic responsibility

through active participation and problem-solving situations in: the community, the improvement of the physical environment, and the development of good human relationships through cooperative projects and activities.

GOAL

To promote the development of aesthetic interests and appreciations

To help the individual become more self-reliant and secure

To provide opportunities for the individual to strengthen his self-concept

To develop awareness, appreciation, understanding and respect for man's relationship and stewardship responsibility to the natural environment

MEANS IN THE OUTDOORS

through participation in positive experiences in the natural environment which contribute to the creative expression of talents and interests.

through adventuresome and challenging outdoor pursuits and skills which require initiative and active participation in solving problems related to comfort, safety and survival.

through achieving success and accomplishments in activities which are meaningful to the learner.

through opportunities for exploration and problem solving in the outdoors.

In summary, Julian Smith et al are saying that outdoor education can create an individual who has a positive attitude toward himself and his environment.

A survey of literature bears out the feelings of Smith. Earl C. Kelly, in "Perspectives on Outdoor Education," (1972, p. 2) states that "by becoming largely urban, we have robbed our young of their reason-to-be," and "that urban life for young people calls for constriction and conformity." This can be interpreted as saying that our children are lacking an education that either the home or the environment had provided before urbanization. This was not formal learning,

but was based on the everyday process of living.

A research study on deprived schools in New York City (MARC Document, March, 1968, p. 15) stated that in their situation, "the atmosphere of the school encourages or depresses learning." The research committee proposed a program of "outdoor community experience" be organized "to provide for the children of deprived areas the kind of diverse stimuli that will renew their motivation of learning." The research committee recommended that a farm or mountain camp be obtained and a program of adventure, science and environmental study, language arts, history and geography could be introduced. The purpose of this program in a site away from the school, would be to:

1. introduce important new environments into the lives of children;
2. break through the walls of alienation that often separate teachers of middle-class backgrounds from the children and parents of the community they serve;
3. awaken new motivation to learn in children whose eagerness has been deadened and renew professional commitment in teachers for whom the frustrations of their jobs have proved stultifying. (p. 17).

It appears to this researcher that education in the late '70's is compartmentalized and restricted. We offer protection to the student--morally, academically and physically.

We do not expose him to stress--mentally or physically. If he is not familiar with stress, how can he cope with it in the real-life situation out of school; how does the student come to realize what he is actually capable of accomplishing and what his limits truly are? The Outward Bound program was established as a result of the realization that man, unless shown what he is truly capable of achieving, tends to downgrade and underestimate his real abilities.

James Ward (1972) supports the notion that outdoor education and the "outdoor setting especially lends itself to helping the individual expand and appreciate the commingling of his sensory powers, his intellectual powers." (p. 106). Perhaps he best summarizes the feelings of the worth of using the outdoors as part of the education process, when he writes that

The outdoors has a strong being quality, a quality of being real, alive and in the process of happening. One is actually involved in and learning about what is. The tangible quality appeals. It pulls the senses. In other words the natural setting, and content is an empirical setting, one that can make strong use of inductive teaching and learning. Here observation is central and offers limitless sensory data to the individual. Learning is individualized. (p. 106).

In support of Ward, Goldstein (1973) wrote that students learn best through "first-hand experience--seeing, hearing, touching new things" and that "students grow with new information and challenge," and "without question students should become aware of themselves in relation to the web of life" (p. 38).

Now let us examine what "outdoor education" is, and what we, as teachers, can do with it. Outdoor education has been defined in many ways, but has been generally interpreted by researchers to mean either education in the outdoors or education for the outdoors. Stuart Langton (1972) suggests that outdoor education has, in various situations, meant "a field of study," "a place for activity," and "a process for learning" (p. 73). Julian Smith et al combines both thoughts and defines it as "learning in and for the outdoors." (p. 20). He adds that it is a "means of curriculum extension and enrichment through outdoor experiences." Charles L. Mard (1967) defines it as "a method of teaching using the natural environment as a living laboratory" (p. VI). He views it as part of the curriculum, not as a separate study or, as he states,

It should be understood that outdoor education is not a new subject in the curriculum or in competition with the traditional material. It is simply a method of instruction. (p. 28).

Charles E. Roth also believes that "outdoor education is a method" (p. 3). Peggy Miller (1968) further emphasizes

this thought by defining outdoor education as "a setting for learning and whatever specific learning experiences in all curricular areas are taught and learned there" (p. 1).

In the opinion of this researcher, three concepts become enmeshed through use and come out in a package called outdoor education. These are recreation-leisure activities, environmental education and outdoor education. Both recreation-leisure activities and environmental education use the process of outdoor education to achieve their goals. Recreation-leisure activities involve activities such as canoeing, skiing, photography and painting. These utilize the method or the spatial definition of outdoor education to provide the means by which an individual can experience them.

Environmental education has been defined as "that aspect of man's education that deals with culturally-imposed, ecologically-related problems in man's environment" (Hungerford, Litherland, 1975). Hungerford and Peyton (1976, p. 2) have concluded that man's demand on the environment has placed a stress on the natural environment that may be of greater consequence than the benefits derived from the use of the environment. They further state that environmental education requires an on-going reclarification of human values, and that it encompasses information from all disciplines. They believe that because it is composed of academic disciplines such as the social sciences, mathematics, language arts, and science, along with an examination of value clarification and problem

solving, environmental education is "an entity to itself" (p. 10).

There appears to be agreement amongst authors that outdoor education is a process or method teaching. This view is supported by Miller (1974) who states that "outdoor education, on the other hand, has never claimed to have any specific subject-matter of its own" (p. 2). Hungerford and Peyton (1976) are specific and state that outdoor education is a "method of instruction" and that "outdoor education can and should contribute substantially to the teaching strategies employed in environmental education" (p. 4).

It is believed that outdoor education should become part of our curriculum and encompass all disciplines currently established in the schools. Problems are created, however, in justifying to school boards, administrators and parents the expense in both money and time. There is a growing concern amongst the above-named groups that our education is rapidly becoming too heavy with frills, at the expense of the basic "3-R's."

The efforts of those involved in outdoor education, therefore, must be coordinated to produce evidence that outdoor education is educationally sound. This is difficult because "the majority of research in outdoor education has focused upon descriptive surveys and historical studies" (Knapp, Clifford, 1972, p. 117). Eugene E. Zersky (1969) realizes this problem and suggests the reason lies within the

nature of what should be measured--attitudes, concepts, emotions--when he states:

In identifying curriculum areas for outdoor education, educators recognize that the end commodity of outdoor education cannot be measured solely in terms of skills or knowledge, because attitudes and concepts and emotions are perhaps more important, and probably more lasting. (p. 33).

Knapp adds that "more empirical research is needed in order to solidify a place for outdoor education in the curriculum" (p. 117).

Evaluative Literature

The evaluative research indicates that empirical studies, at both the elementary and secondary levels, in the majority of cases, have been based on the observations of students by outside evaluators. In addition, a search of the literature has indicated that research on attitude change has been limited to the residential camping experience. The notable exception is the evaluative research conducted by Benton (1975) at Laidlaw School in the Assiniboine-South School Division.

Benton conducted research on an eight-month outdoor education program given to one of two groups of Grade VII students selected from two different schools. The remaining

group served as a control and was taught by traditional methods. His purpose was to evaluate the effects of the outdoor education process on student development of basic academic skills, attitudes toward formal education and on appropriate study habits. His results indicated that the outdoor education program did significantly affect the positive development of basic academic skills, attitudes toward formal education, and appropriate study habits. His research on parental and teacher opinions toward the program supported his original findings.

Neil Friesen et al (1970) at Prendergast School in the St. Boniface School Division No. 4, attempted to evaluate parental feelings toward the outdoor program in their elementary school. Seventy-three parents responded to a questionnaire that asked them to rank the changes in attitude they perceived in their children. The following is the questionnaire and its responses:

PARENT EVALUATION QUESTIONNAIRE

1. My evaluation of the outdoor education program this year.

excellent				very poor
53	13	7		
1	2	3	4	5

2. I notice a change in my child's attitude toward:

for the better	none	for the worse
----------------	------	---------------

- a) teachers

46	13	14		
1	2	3	4	5

	for the better		none		for the worse
b) school	43	17	13		
	1	2	3	4	5
c) other children	24	23	25		
	1	2	3	4	5
d) nature	32	21	15	1	
	1	2	3	4	5
e) parents	24	15	31		
	1	2	3	4	5
f) being responsible	32	18	20	1	
	1	2	3	4	5

(p. 3).

From the responses, there is an indication that the majority of parents favored the program and, more important, they noticed a positive change in attitude of the children for their teachers, school, other children, nature, parents, and responsibility. There was, however, no attempt to directly evaluate student attitude changes. Their results were based on parental observations.

In order to provide more information for staff planning, Prendergast School surveyed the parents of the total school population in the school year 1974-75. In total, 352 questionnaires were sent out and 254 were returned. The following questions and their responses were selected from the questionnaire by this researcher, as they pertain directly to his research.

Table 1

Excerpts from Prendergast School Parental Survey

	A	B	C	D	E	No Reply
1. The out-of-school excursions seem to be closely related to regular school work.	24%	53%	13%	4%	0%	6%
2. Basic skills in reading, writing, arithmetic and so on, are not being neglected because of the out-of-school program, but strengthened.	26%	48%	13%	6%	1%	5%
3. My child benefits from these out-of-school experiences (field trips and excursions).	52%	36%	6%	2%	0%	4%
4. I have noticed the Camp Stephens program has enhanced my child's attitude toward school, learning, teachers, peers, and nature.	21%	17%	14%	3%	3%	42%
5. Prendergast School philosophy and programs should continue to include out-of-school activities.	62%	29%	4%	1%	0%	4%

The research from Prendergast School has indicated that

1. The parents believe that the outdoor education program has been an integral part of the school program. (Refer to item 1 of the questionnaire).

2. The parents believe that an outdoor education program does not detract from the basic skills. (Refer to item 2 of the questionnaire).

3. The parents believe that their children had benefited by the outdoor education program. (Refer to item 3 of the questionnaire).

4. The parents perceived a change in attitude in their children. (Refer to item 4 of the questionnaire).

5. The parents wished the program to continue. (Refer to item 5 of the questionnaire).

The questionnaire provided space for additional written comments. This researcher selected responses which reflected the parents' perceived changes in the attitudes of their children. These were given as follows:

I feel this program is very good and has definitely enhanced our child's attitude toward school and life in general.

It's a good program. Keep it up. There's more to education than what is taught in the classroom.

I think the outdoor excursions give the kids a lot more interest in their school work.

My child's attitude toward school, teachers, so on, has always been satisfactory, therefore, I did not notice any change after the trip to Camp Stephens.

It seems that besides being a learning experience, the excursions make school and learning a happy time - a break from routine which is good.

The previous 1970 survey at Prendergast School and the 1974-75 survey, indicate that some parents have noticed changes in the attitudes of their children. However, as this researcher has indicated previously, a direct measurement of attitude change was not made on the students themselves.

Mansfield Woolfork (1971) evaluated the 1971 outdoor education and school camping program of the Detroit Public Schools. His evaluations were based on 1400 campers attending four sessions of two-week camping experiences. The program involved:

- hikes,
- fishing,
- cookouts,
- crafts,
- talent shows,
- social games,

dancing games,
 catching and caging small animals,
 educational displays of Natural History. (p. 1)

The objectives of the program were to

- improve self-concept,
- develop socialization,
- enhance cultural growth,
- improve camping skills,
- improve recreational skills and safety practices by providing learning experiences in a natural setting. (p. 1)

When 124 randomly selected campers were given a nine-item questionnaire, on a pre- post-basis, there was no significant change in self-concept.

The Camper Experience questionnaire showed that 64% enjoyed it, 73% would like a longer period, 91.9% enjoyed the food, 44% experienced difficulty adjusting to the eating schedule (pp. 13-14).

Each camper was evaluated by a counsellor, as to the benefits the camper had received. The following are their results:

Benefits that the Campers Received

<u>Benefit</u>	<u>Frequency</u>
Group Living	50%

<u>Benefit</u>	<u>Frequency</u>
Making New Friends	40%
Increased Respect for Adults and Peers	30%
Gain in Independence	27%
Change of Environment	20%
Maturation	15% (P. 15).

Adverse effects were also noted and evaluated. These resulted in the following findings:

<u>Adverse Effect</u>	<u>Frequency</u>
Parent Visits	50%
Camp Schedule Too Much like School	25%
Fear of Darkness and Outdoors	20%
Homesickness	15%
Punishment	10%

Woolfork believed that the objectives of the program had been met. He noted that a change in self-concept was not evident, but that a change in attitude toward staff and peers did emerge. Also, counsellor observations indicated that camping and recreational skills did improve, as did participation. Based on the achievement of these objectives, he believes that the program should continue (p. 17).

Both of the studies, at Prendergast School in St. Boniface and in Detroit, are based on external observations

and subsequent evaluation. There had been no attempt to measure directly the change in attitude, skills or concept attainment in the students at Prendergast School, and only a superficial attempt was made by Woolfork.

In 1976, O.J. Irving examined the effect a resident outdoor education program had on student social relationships. The students studied were 310 Grade V and VI students from five Winnipeg area schools. Each school had conducted separate residential outdoor education programs at Camp Arnes during 1975. Irving measured attitude changes in four areas: student-student relations, student-teacher relations, students' attitudes toward sharing and student attitudes toward working in a group. He tested them five days before camp, one day before camp and the day subsequent to their arrival from camp. The results showed that there was a change in attitude in the areas of student-student relations, student attitudes toward working in a group and in student-teacher relations. The students' attitude toward sharing did not seem to be affected by the residential experience.

This study, although it measured attitude change in students directly, was based on a residential program. It did not examine whether the changes were due to the process of outdoor education or to the experience of being at camp. It was further restricted to elementary school children.

In 1971, the Taft Campus of the Department of Outdoor Teacher Education, Northern Illinois University, published a

paper titled "Taft Campus Occasional Paper No. 4." The paper described the research on parents' perceptions of resident outdoor education.

The study involved the surveying of parents whose children had attended a week-long residential outdoor education program for elementary schools from northern Illinois. The sites used were Lorado Taft Field Campus and Rockford Outdoor School. At Taft the teaching was done by senior level college students enrolled in the undergraduate elementary education program. Rockford Outdoor Education School had its own professional staff.

The purpose of the study was to evaluate the parental perception of outdoor education in order to document the continued need for financial support, from both the parents and state/federal funds.

Swan and Jones (1971) report in their study that numerous studies undertaken reveal that the majority of parents were in favor of outdoor education programs. They report that Bell and Tobin (1957, pp. 102-107) found that "parents perceived knowledge, skills and appreciation of the outdoors to be the most important outcome; and a better understanding of group living to be the next most important." In researching the literature, Swan and Jones further report that Norbert Ziemer (1971) surveyed parents and found that "more than 75% of the parents who responded to the questionnaire indicated that the program provided children with (a) opportunities for the development of responsibility, (b) experiences to

improve self-image and self-concept, (c) opportunities for enhancing the child's relationship within the class structure.

As a result of their study, Swan and Jones have made the following conclusions:

1. Boys' and girls' relationships with classmates appear to have been affected in a positive manner.
2. Both sexes looked forward to and enjoyed the week because the emphasis was on outdoor activity rather than classroom activity.
3. Responses did not support the belief that most pupils get to know their classroom teacher better as a result of the experience.
4. Children's manners did not improve as a result of the experience.
5. Parents did not perceive that children had developed a new appreciation and understanding of their own family.
6. Less than one-half of the pupils appeared to be more concerned about the "feelings and rights of other people" as a result of the week.
7. Generally, the pupils increased their knowledge of "good conservation practices," and became more aware of problems of air and water pollution.
8. Although a substantial number of the pupils improved their skills in the use of library and research materials, a smaller number increased their interest and knowledge of mathematics. (p. 58).

Swan and Jones further analyzed their results, and were able to break down the parental reports as to the sex of the children. As a result of this part of the study, they report that

1. The resident program enhanced the boys' self-confidence more than the girls'.
2. The resident program improved the girls' attitude toward school more than the boys'. (p. 57).

From their study, Swan and Jones conclude that children with low self-confidence might benefit from a residential outdoor education program. They recommend that the study be repeated, but that the testing of attitudes be measured directly from the pupils (p. 59).

Their research and recommendations have important implications for this researcher, as they suggest that attitudes can be changed through an outdoor education program and also that direct testing be performed on the students, rather than relying on observations of parents and camp counsellors.

Albert Alexander (1969) did a "comparison of the self-concepts of boys from low-income families, some experiencing a camping program and some without the camping experience" (p. 1). Seventy-five boys were assigned to each group and ranged in age from 11 years to 15 years. One group received a residential camp experience and the other group received no special treatment. The boys were administered the Tennessee Self-Concept Scale and the researcher's own Behaviour Rating Scale on a pre- post-basis. Alexander found that "a comparison of the pre- and post-test scores showed a positive change for each group but there was no significant difference between the two groups. On the Behaviour Rating Scale, there was an improvement in social behaviour but there was no correlation to the Self-Concept score. Although there was a greater change in the self-concept by the young campers than older campers, the differences were not significant. There was a decline in the camper's self-concept when measured six

weeks after returning to his home but was not statistically significant" (p. 12).

Alexander's study recommends that a day camp experience be evaluated. In addition, this researcher notes that the study was limited to the self-concept changes in students from low-income families. This study supports the need for research into other attitude changes, made on short-term, non-resident outdoor education programs.

McNamara (1971) examined the significant difference in overall achievement, critical thinking, preference for the out-of-doors, and the individual achievement concepts between groups experiencing laboratory investigations indoors and those working outdoors. Pre-testing was done with the ESCP Unit Achievement Test I, the Cornell Critical Thinking Test, and the McNamara Indoor-Outdoors Preference appraisal. All work for the indoors group was conducted indoors as well as all phases except the laboratory work for the outdoors group. Five significantly different groups were identified with one-half of each group randomly assigned to the outdoor group. After three chapters were covered, Concept Test I was administered and Concept Test II was administered after the sixth chapter was completed. Post-testing with the ESCP Achievement Test, the Cornell Critical Thinking Test, and the McNamara Indoor-Outdoor Preference Appraisal was held after the six chapters were completed.

McNamara's results indicated that "significant

differences between treatment groups may be found when evaluating single concepts rather than overall achievement" (p. 65).

He concluded that "learning was enhanced in the outdoors if the concepts are directly related to the environment" and that "critical thinking and preference for the outdoors was changed favorably for those working in the outdoors" (p. 65).

This study provided much needed data on the effects of short-term outdoor education programs on overall achievement. It provided only a superficial study of the effects of short-term programs on attitude change.

In 1972, Aronstein completed a study on attitude change in college students who had participated in an environmental community service project. Employing various tests on a pre- and post-test basis, Aronstein found that

1. positive attitude changes occurred in relation to environmental problems, exercising leadership, initiative and self-direction;
2. no definitive attitude change toward peer groups had occurred;
3. a positive attitude change occurred toward the community and community leaders with whom they worked;
4. at the end of the program, students preferred out-of-classroom teaching-learning experiences.

(p. 97).

This study creates the question of whether the same

results would occur in high school students, exposed to a similar program. His research indicated a student preference for out-of-classroom teaching, but further studies are required to compare them to classroom teaching.

Ronald C. Wise (1970) researched the achievement of 261 fifth grade pupils in science. The study involved three different classes per school from three different schools. The pupils were taught science by three different methods: direct experience, outdoor classroom, and indoor classroom. They were pre-tested immediately before and post-tested immediately after a three-week period of instruction. A retention test was given three weeks after the instruction period. As a result, Wise found that there was no significant difference between the three groups on either the post-test or retention scores with regard to science knowledge or science comprehension (p. 162).

Consequently, this researcher will attempt to investigate if the same lack of significant change would occur in a high school program, that was of shorter duration, more intensive and included the use of lifetime recreational skills.

Burchett (1971) wanted to examine the factors suitable for further study in developing positive attitudes in school children toward environmental problems. She developed a two-part test containing a semantic differential portion and a Likert-type portion. These were administered to three students (one from each of the Grades IV, V, VI) on a pre- post-test basis. The three students were selected on the basis of

their attitude toward the environment. Two had negative attitudes and one was non-committal. Only three students were observed, as Burchett wanted to observe the students closely, a feat she felt was not possible with larger numbers of students. The students had received a series of lessons on selected environmental topics. Burchett reports that there was a positive change in attitude toward the environment, with a greater change in attitude toward the future environment than the present environment (p. 102).

Burchett's study was limited in that it only examined three students. It would be impossible to apply her findings to a generalization in support of attitude change as a result of an environmental program. Her research indicates the program should be tested on a larger sample size.

Summary

The literature review examined the personal needs and educational goals of the individual student and how the process of outdoor education could provide for the attainment of these needs and goals. Studies have shown that some change in attitudes does occur. In addition, the literature indicates that direct measurement of the student is required, in preference to analysis of data gathered through observation of students. It was noted that there was a need for a more intensive study of non-residential outdoor experiences, and that research on high school outdoor programs was lacking.

CHAPTER III

PROCEDURE AND IMPLEMENTATION OF THE STUDY

Introduction

Three groups of students from Sisler High School were involved in the study: a control group and a treatment group made up of Biology 200 students, and an informal group of students involved in an extracurricular outdoor education experience. The control group and treatment group were pre-tested as to their attitudes and their knowledge in environmental education. These two groups were then given a program in environmental education with the following difference: the treatment group was instructed using outdoor education processes, while the control group was instructed in a classroom setting. These groups were then given a post-test to measure their change in attitude and environmental knowledge. The informal group was tested only for their attitudes.

Selection and Description of Sample

The students selected for the study were in attendance at Sisler High School in the Winnipeg School Division No. 1 during the school year 1973-74. The total study involved three groups of students. In the study involving a change of attitude and a change in academic scores, two groups of

students were considered: a treatment group and a control group. The treatment and control groups were Grade XI Biology 200 students. The third group (the informal group) of students involved in the study were members of the extra-curricular Outdoors Club. This group represented students experiencing an informal outdoor education program and was made up of Grade X, XI, XII students who voluntarily applied for membership in the Outdoors Club. This informal group was given the attitude tests as a measure of positive attitudes and was compared only to the treatment group.

The Biology 200 students were parallel timetabled each with a different instructor. However, for the period of this study, both the treatment group and the control group were instructed by the researcher. Each class (control and treatment) consisted of twenty-five students, both male and female. Placement in either class was performed randomly by a computer. The only pre-requisite for the course was that the students must have successfully completed a Grade X science program. The computer placement considered all options the students had selected. The biology program they selected was the Biological Science Curriculum Study (Blue Version, 1968), published by Houghton-Mifflin, Boston.

One class of twenty-five students, consisting of eight males and seventeen females, was selected as the treatment group. The alternate section of twenty-five students,

consisting of twelve males and thirteen females, was designated as the control group. The selection of the designation as either control group or treatment group was made by flipping a coin. In order to conceal the identities of the individual students, each student used a number consisting of the last four digits of his/her telephone number. This number was to allow the students more personal freedom in honestly answering the questions. The students were not aware that they were part of a research study.

Description of Treatments

The Treatment Group. The treatment group was given a twelve-day program in environmental education using the process of outdoor education as the teaching method. The twelve-day teaching period was conducted outside the classroom using the local community. In addition to the time spent during the regular school day, four early morning, pre-school sessions were conducted at the Centennial Swimming Pool, giving the students a canoe instruction program. In addition, two afternoon class periods were extended into the evening (until 6:00 p.m.) to allow for trips to Birds Hill Park and LaBarriere Park. Arrangements were made to take the students to the Delta Waterfowl Research Station for a full day during school time. As the treatment group was operating outside the classroom, the researcher was taking colored slides of the areas studied. These were used as part of the classroom

presentation made to the control group. All activities were instructed by the researcher.

The Control Group. The control group was given a twelve-day environmental education program immediately after the program for the treatment group was completed. Sample materials gathered by the treatment group were used in experiments by the control group which were conducted in the classroom. Formal lectures were given and care was taken to ensure that the same content material had been covered by the treatment and control groups. Slides, taken during the field trips by the students of the treatment group, were shown as part of the in-class presentations for the control group. These slides were taken so that students were not in the pictures. The only difference in the presentation to the treatment and the control group was that the control group did not have the out-of-class experience. All classes were conducted by the researcher.

The Informal Group. The informal group was given an informal, extracurricular outdoor education program, with the emphasis on recreational pursuits such as canoe-tripping, horseback riding, snowshoeing, and cross-country skiing. These sessions were conducted out of school time by the researcher. No formal teaching was attempted to emphasize environmental concerns. The informal group consisted of twenty-six full-time members of the Club who consented to

complete the same Attitude Test as was given to the control and treatment groups. Content was not tested, as they were used only to compare the attitudes between the informal and formal out-of-class experiences.

Design of the Attitude Instrument

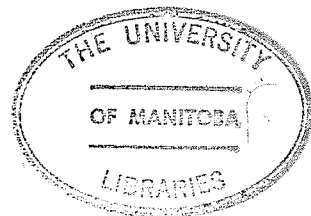
Development of the Attitude Instrument

The attitude test consists of 100 items and examines four areas. These four areas are:

1. self-concept,
2. attitude toward teachers,
3. attitude toward school,
4. attitude toward environment.

Each area consists of 25 items which were selected as follows:

Self-concept. Fifteen items were selected from "The Adjustment Inventory" by Hugh M. Bell (1962). The items came from the emotional scale of the test, and were selected by the researcher from an original 35 items on the basis of their suitability to the study. An additional ten items were designed and added by the researcher. These were items not covered in Bell's original work. Bell describes his test as reflecting "an individual's subjective impressions of his own adjustment in areas determined by the test" (p. 1).



Attitude Toward School. The "School Sentiment Index" (The Instructional Objectives Exchange) provided 25 items for this area of the test. From an original 25 items found in the section titled "School Social Structure and Climate," thirteen items were selected, six items found in "Peer" resulted in one item being selected, and the eleven items found under "General Attitudes" were all selected (p. 45). The items were selected on their suitability to the study.

The "School Sentiment Index" provides for a scoring on a "strongly agree - strongly disagree" order. The original scoring was extended from four possible responses to five, for purposes of this study. The original test covered 83 statements and attempted to measure student responses to statements of attitude toward school.

Attitude Toward Teacher. The "School Sentiment Index" provided 25 items from the area of its test covering attitudes toward teachers (p. 46). From the topic "Mode of Instruction," 13 of an original 17 items were selected. The entire question block from "Interpersonal Relationships" was selected.

Attitude Toward Environment. Robert E. Roth (1970) undertook a study of what concepts of environmental education are considered to be of prime importance and should be included in a curriculum of study for Grades K-16. An original list of 128 concepts was sent out to 699 scholars from 40 professional areas and 12 ecological regions. The response totalled 350 of 699 surveyed, and 11 of 128 concepts met the "criterion of acceptance by 90% of the respondents."

In examining Roth's list of concepts, the researcher selected those items with a weighted item mean score equal to or greater than four out of a total of five. A total of 21 items exhibited this criteria and 20 of these were selected for the test; one item was unsuitable as it related to a regional question with which the students would not be familiar. Items that were worded in a manner that the researcher estimated would be difficult for a high school student to interpret were reworded. An additional five items were added, from the researcher's own work, to complete the test.

Scoring of the Attitude Test

The complete attitude test consists of the 100 items selected from the above sources. The respondents have a choice of selecting one of five answers, on a weighted Likert scale, each of which is anonymously weighted in a nominal manner, as follows:

<u>Strongly Agree</u>					<u>Strongly Disagree</u>	
()	()	()	()	()		
5	4	3	2	1	(represents anonymous weighting).	

Therefore, the maximum score attainable in any one section of the test was 125 (25 items x 5).

The order in which the items were placed into the test was established by placing each item on a piece of

paper and selecting each item at random from a container. The order in which each was drawn determined its position in the test.

Validity of the Attitude Instrument

Content validity was established by selecting tests that had been published and were widely used. The Adjustment Inventory had validity determined by Bell. Through various testing means, he determined that the coefficients of validity for the "Thurstone Schedule and Emotional-Adjustment Section" were 0.93 ± 0.10 (p. 81).

The "School Sentiment Index" was developed by the Instructional Objectives Exchange under a Title III program. The developers of the program designed the program for group assessment and not for a given attitudinal measure for an individual child. To establish content validity the program was submitted to a group of external consultants for appraisal.

Reliability of the Attitude Instrument

Bell applied the Spearman-Brown prophecy formula to scores obtained from 258 college students. The coefficient of reliability for the emotional adjustment was $r = .85 \pm .018$ (p. 80).

The purpose of Roth's study (1970) was to develop conceptual objectives for environmental management education. He submitted 128 concepts to a national panel of 699

specialists from 40 disciplines.

The total attitude test was then submitted to four local guidance counsellors who examined the individual items. Those items which the counsellors agreed would measure attitudes were retained.

Reliability of Attitude Test

Reliability was statistically established by utilizing a split-test Pearson Product-Moment Correlation, yielding an 'r' value. Twenty students in the Outdoor Club had their attitude test results split in half, based on even-odd categories and an analysis performed. These twenty students were randomly chosen by selecting the last four digits of their telephone numbers from a random number table. The basic computational formula used for the Pearson Product-Moment Correlation is:

$$r = \frac{N \sum xy - (\sum x) (\sum y)}{\sqrt{[N \sum x^2 - (\sum x)^2] [N \sum y^2 - (\sum y)^2]}}$$

where N = number of pairs of scores;

$\sum xy$ = sum of the products of the paired scores;

$\sum x$ = sum of scores on even scores;

$\sum y$ = sum of scores on the odd scores;

$\sum x^2$ = sum of the squared scores on the even scores;

$\sum y^2$ = sum of the squared scores on the odd scores.

Because the test was divided in half, the whole test was actually twice as long as either half used to compute the reliability coefficient. Therefore a corrected value is necessary that would pertain to the test as a whole, rather than to half of it (Bruning & Kintz, 1968, p. 187). This was accomplished by utilizing the Spearman-Brown Prophecy formula for predicting reliability. The formula used is as follows:

$$\text{Estimated Spearman-Brown Reliability of Total Instrument} = \frac{2 \times \text{actual correlation between halves of the instrument}}{1 + \text{actual correlation between halves of the instrument}}$$

(David J. Fox, The Research Process in Education, p. 358).

Results of the test for Reliability

The reliability coefficients for each part of the attitude tests obtained were:

<u>Attitude</u>	<u>Corrected Spearman-Brown Reliability Estimate</u>
Self-concept	.81
Attitude toward School	.84
Attitude toward Teachers	.73
Attitude toward Environment	.82

All coefficients were statistically significant at the .01 confidence level.

Design of the Environment Cognitive Test

Development of the Instrument

The Environment Cognitive Test was designed to measure the attainment of content relating to the local environment. Roth's list (1968) of environmental concerns was used as a guide to provide a direction to the content requirements. Care was taken to ensure that only those content areas covered by the researcher, while conducting the classes, were examined.

Fifty questions were originally established and submitted to a panel of three local high school science teachers. Twenty-five of the top-rated questions were finally selected as the final test device. These questions were multiple choice in design, involving five possible student choices. A penalty of 1/5 of a mark was assessed for each incorrect answer, in order to dissuade students from guessing.

Validity of the Instrument

Validity was established by selecting topics which Roth (1968) in his research had found have a high response as to the content of an environmental teaching program. The test items were submitted to a panel of three local high school science teachers and items which they felt were appropriate were selected. The researcher attempted to cover all subject matter, examined by the test, when he

presented the material in class to both the control group and experimental group.

Reliability of the Instrument

Reliability of the instrument developed by this researcher was established using a pre-test/post-test measure on the experimental group. The statistical test used was a Pearson Product-Moment Correlation (Bruning & Kintz, 1968), yielding an 'r' value. The significance of 'r' was subjected to a t-test because the sample number 'N' was less than 30.

The formula used to compute the Pearson Product-Moment Correlation was (Bruning & Kintz, 1968, p. 155):

$$r = \frac{N \sum xy - (\sum x)(\sum y)}{\sqrt{\left[N \sum x^2 - (\sum x)^2 \right] \left[N \sum y^2 - (\sum y)^2 \right]}}$$

This yielded an 'r' value of .51475.

The t-test formula used to determine the significance of an 'r' value of .51475 was (Bruning and Kintz, 1968, p. 155):

$$t = r \sqrt{(N - 2)/(1 - r^2)}$$

where r = established Pearson Product-Moment Correlation

N = number of subjects.

This yielded a 't' value of + 2.879. At 23 degrees of freedom, the .01 alpha level of significance is 2.807. The test

value of $t = 2.879$ was significant. The researcher, therefore, concluded that the Environment Cognitive Test was reliable at a .01 alpha level.

Data Analysis

Scores obtained on the pre- post-attitude tests within groups, for both the control and treatment groups, were analyzed using "the t-Test for Related Measures" (Bruning & Kintz, 1968, p. 13). The formula used to determine 't' for related measures was:

$$t = \frac{\bar{x} - \bar{y}}{\sqrt{\frac{S_x^2 + S_y^2 - 2 r S_x S_y}{N}}}$$

where S_x^2 = variance of the x scores;
 S_y^2 = variance of the y scores;
 r = correlation between x and y;
 N = number of pairs of scores.

Calculations were performed by a computer program titled "Paired Student's t-Test Program" developed by F. Chebib and K. Carpenter (1972) at the Computer Centre, University of Manitoba. Output consisted of:

1. A list of input data and the differences in the pairs.

2. Mean for each treatment and the mean difference, the standard error of the mean difference, the student 't' value and the theoretical student 't' value at the 1% level.

The degrees of freedom ($df = 48$) determined that, to be significant, the 't' value at the alpha level .01 must be equal or greater than 2.797.

The difference between pre- post-scores on the attitude test was calculated for both the control and treatment groups. These differences were then compared by a 't-test' for a difference between two independent means. The formula used was (Bruning & Kintz, 1968, p. 10):

$$t = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\frac{\sum x_1^2 - (\sum x_1)^2}{N_1} + \frac{\sum x_2^2 - (\sum x_2)^2}{N_2}} \cdot \sqrt{\frac{1}{N_1} + \frac{1}{N_2}}}$$

where \bar{x}_1 = mean of the control group of scores;

\bar{x}_2 = mean of the treatment group of scores;

$\sum x_1^2$ = sum of the square score values of the control group;

$\sum x_2^2$ = sum of the square score values of the
treatment group;

$(\sum x_1)^2$ = square of the sum of the scores of the
control group;

$(\sum x_2)^2$ = square of the sum of the scores of the
treatment group;

N_1 = number of scores in control group;

N_2 = number of scores in treatment group.

The calculations were performed by a computer program titled "Unpaired Students' t-Test Program" developed by Chebib and Carpenter (1972) at the Computer Centre, University of Manitoba. Output consisted of:

1. A list of input data and the differences in the pairs.
2. Mean for each treatment and the mean difference, the standard error of the mean difference, the student 't' value and the theoretical student 't' value at the 1% level.

The degrees of freedom ($df = 48$) determined that to be significant, the 't' value at the .01 alpha level must all be equal to or greater than 2.682.

An F test was performed on the s.d. obtained from the t-test for differences from pre- to post-attitude testing. This was done to verify the results of the t-test. The formula used for the F test was (Bruning & Kintz, 1968,

p. 107):

$$F = \frac{\text{variance}_1}{\text{variance}_2}$$

where: variance_1 = largest variance of the groups;

variance_2 = smallest variance of the groups.

The variance was obtained by squaring the s.d. of the treatment and control groups. The d.f. was 24/24 (Bruning & Kintz, 1968, p. 107).

The differences between the pre- and post-cognitive tests were obtained for both the control and treatment groups. The differences were then analyzed by performing an "Unpaired Students' t-Test Program," developed by Chebib and Carpenter and previously described on Page 52. The formula used was:

$$t = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\frac{\left[\frac{\sum x_1^2 - (\sum x_1)^2}{N_1} + \frac{\sum x_2^2 - (\sum x_2)^2}{N_2} \right] \cdot \left[\frac{1}{N_1} + \frac{1}{N_2} \right]}{(N_1 + N_2) - 2}}$$

The degrees of freedom (df = 48) determined that, to be significant, the 't' value at the .01 alpha level must be equal to or greater than 2.682.

This researcher declared that a value of 3 on any one test item in the attitude test was an indication of a positive attitude, on a Likert (1 - 5) scale. (See scoring of the attitude test on page 48). As any one of the four sections of the test had 25 questions, a score of greater than 75 (3 x 25) was taken as a positive attitude for that section. The proportion of students from the informal group surpassing 75 on the attitude tests in relation to the total number in the informal group, was analyzed by comparing them to the proportion of students from the treatment group who surpassed 75 on their post-attitude tests in relation to the total number in the treatment group. The test used was a "Test for Significance of a Proportion" (Bruning & Kintz, 1968, p. 197). The formula for the test was:

$$Z = \frac{p - P}{\sqrt{\frac{P(1 - P)}{N}}}$$

where Z = Z - test for significance;

p = proportion of students surpassing the established score in relation to the total number in the trial group;

P = established ratio of students surpassing the established score in relation to the total number of that particular group;

N = number of students in the trial group.

In order to have a significant difference, the Z would have to be greater than, or equal to, ± 1.96 at a .05 level of confidence. A significant Z would mean that the + attitude scores of the informal group differed significantly from the + post-attitude scores of the treatment group.

A further analysis was performed to test for differences between variances of two independent samples--the informal group and the treatment group. The F test previously described on page 53 was utilized.

The results of the attitude test given to the members of the Outdoor Club were submitted to a "Basic Statistics Program" developed by F. Chebib, K. Carpenter and D. Reimer, using the computer at the Computer Centre. This was used to provide a comparison of means.

Hypotheses

The following null experimental hypotheses were tested at an alpha level of .01 ($\alpha = .01$).

General Hypothesis I:

Students taught environmental education, utilizing outdoor education procedures, will show no significant change in attitude when compared to students taught environmental education in the classroom.

Symbolically -

$$H_0: u_I = u_I$$

$$H_1: u_I \neq u_I$$

Legend: u_I = mean scores of students' attitudes when taught environmental education utilizing outdoor education procedures.

u_I = mean scores of students' attitudes when taught environmental education in the classroom.

Specific Hypothesis Ia

Students taught environmental education in the classroom will not show a significant change in attitude toward their school upon completion of the program.

Symbolically -

$$H_0: u_{Ia} = u_{Ia}$$

$$H_1: u_{Ia} \neq u_{Ia}$$

Legend: u_{Ia} = mean score of the pre-test of students' attitudes toward school.

u_{Ia} = mean score of the post-test of students' attitudes toward school.

Hypothesis Ib

Students taught environmental education in the classroom will not show a significant change in their self-concept upon completion of the program.

Symbolically -

$$H_0: u_{Ib} = u_{Ib}$$

$$H_1: u_{Ib} \neq u_{Ib}$$

Legend: u_{Ib} = mean score of pre-test of students' self-concept.

u_{Ib} = mean score of post-test of students' self-concept.

Hypothesis Ic

Students taught environmental education in the classroom will not show a significant change in attitude towards their teachers, upon completion of the program.

Symbolically -

$$H_0: u_{Ic} = u_{Ic}$$

$$H_1: u_{Ic} \neq u_{Ic}$$

Legend: u_{Ic} = mean score of pre-test of students' attitudes towards their teachers.

u_{Ic} = mean score of post-test of students' attitudes towards their teachers.

Hypothesis Id

Students taught environmental education in the classroom will not show a significant change in attitude towards the environment, upon completion of the program.

Symbolically -

$$H_0: u_{Id} = u_{Id}$$

$$H_1: u_{Id} \neq u_{Id}$$

Legend: u_{Id} = mean score of pre-test students' attitudes towards the environment.

u_{Id} \neq mean score of post-test students' attitudes towards the environment.

Hypothesis Ie

Students taught environmental education utilizing outdoor education procedures will not show a significant change in attitude towards their school, upon completion of the program.

Symbolically -

$$H_0: u_{Ie} = u_{Ie}$$

$$H_1: u_{Ie} \neq u_{Ie}$$

Legend: u_{Ie} = mean score of pre-test of students' attitudes towards school.

u_{Ie} = mean score of post-test of students' attitudes towards school.

Hypothesis If

Students taught environmental education utilizing outdoor education procedures will not show a significant change in their self-concept.

Symbolically -

$$H_0: u_{If} = u_{If}$$

$$H_1: u_{If} \neq u_{If}$$

Legend: u_{If} = mean score of pre-test of students' self-concept.

u_{If} = mean score of post-test of students' self-concept.

Hypothesis Ig

Students taught environmental education utilizing outdoor education procedures, will not show a significant change in attitude towards their teachers.

Symbolically -

$$H_0: u_{Ig} = u_{Ig}$$

$$H_1: u_{Ig} \neq u_{Ig}$$

Legend: u_{Ig} = mean score of pre-test of students' attitudes towards their teachers.

u_{Ig} = mean score of post-test of students' attitudes towards their teachers.

Hypothesis Ih

Students taught environmental education, utilizing outdoor education procedures, will not show a significant change in attitude towards the environment.

Symbolically -

$$H_0: u_{Ih} = u_{Ih}$$

$$H_1: u_{Ih} \neq u_{Ih}$$

Legend: u_{Ih} = mean score of pre-test of students' attitudes towards the environment.

u_{Ih} = mean score of post-test of students' attitudes towards the environment.

Hypothesis Ii

Students taught environmental education, utilizing outdoor education procedures, will show no significant change of attitude toward their school when compared to students taught environmental education in the classroom.

Symbolically -

$$H_0: u_{Ii} = u_{Ii}$$

$$H_1: u_{Ii} \neq u_{Ii}$$

Legend: u_{Ii} = mean scores of pre- post-differences in students' attitudes towards school when taught environmental education utilizing outdoor education procedures.

u_{Ii} = mean scores of pre-post-differences in attitudes towards school when taught environmental education in the classroom.

Hypothesis Ij

Students taught environmental education, utilizing outdoor education procedures, will show no significant change in their self-concept when compared to students taught environmental education in the classroom.

Symbolically -

$$H_0: u_{Ij} = u_{Ij}$$

$$H_1: u_{Ij} \neq u_{Ij}$$

Legend: u_{Ij} = mean scores of pre- post-differences in students' self-concept when taught environmental education utilizing outdoor education procedures.

u_{Ij} = mean scores of pre- post-differences in students' self-concept when taught environmental education in the classroom.

Hypothesis Ik

Students taught environmental education utilizing outdoor education procedures, will show no significant change of attitude toward their teachers when compared to students taught environmental education in the classroom.

Symbolically -

$$H_0: u_{Ik} = u_{Ik}$$

$$H_1: u_{Ik} \neq u_{Ik}$$

Legend: u_{Ik} = mean scores of pre- and post-differences in students' attitudes towards their teachers when taught environmental education utilizing outdoor education procedures.

u_{Ik} = mean scores of pre- post-differences in students' attitudes toward their teachers, when taught environmental education in the classroom.

Hypothesis II

Students taught environmental education utilizing outdoor education procedures, will show no significant change of attitude toward the environment when compared to students taught environmental education in the classroom.

Symbolically -

$$H_0: u_{II} = u_{II}$$

$$H_1: u_{II} \neq u_{II}$$

Legend: u_{II} = mean scores of pre- post-differences in students' attitudes toward the environment when taught environmental education utilizing outdoor education procedures.

u_{II} = mean scores of pre- post-differences in students' attitudes toward the environment when taught environmental education in the classroom.

General Hypothesis II:

Students taught environmental education utilizing outdoor education procedures, will show no significant improvement in academic scores in biology class when compared to students taught environmental education in the classroom.

Symbolically -

$$H_0: u_2 = u_2$$

$$H_1: u_2 \neq u_2$$

Legend: u_2 = mean scores of student change in academic scores, when taught environmental education utilizing outdoor education procedures.

u_2 = mean scores of student change in academic scores, when taught environmental education in the classroom.

General Hypothesis III

Students taking part in an informal outdoor experience will not show a positive self-concept when compared to the attitudes of students who completed an environmental education program utilizing outdoor education procedures.

Symbolically -

$$H_0: (\sigma_3)^2 = (\sigma'_3)^2$$

$$H_1: (\sigma_3)^2 \neq (\sigma'_3)^2$$

Legend: $(\sigma_3)^2$ = variance of the self-concept scores of the informal group.

$(\sigma'_3)^2$ = variance of the post-test self-concept scores of the treatment group.

General Hypothesis IV

Students taking part in an informal outdoor experience will not show a positive attitude toward their school, when compared to the attitudes of students who completed an environmental education program utilizing outdoor education procedures.

Symbolically -

$$H_0: (\sigma_4)^2 = (\sigma'_4)^2$$

$$H_1: (\sigma_4)^2 \neq (\sigma'_4)^2$$

Legend: $(\sigma_4)^2$ = variance of the attitude scores of the informal group towards their school.

$(\sigma'_4)^2$ = variance of the attitude scores of the treatment group towards their school.

General Hypothesis V

Students taking part in an informal outdoor experience will not show a positive attitude toward the environment, when

compared to the attitudes of students who completed an environmental education program utilizing outdoor education procedures.

Symbolically -

$$H_0: (\sigma_5)^2 = (\sigma_5')^2$$

$$H_1: (\sigma_5)^2 \neq (\sigma_5')^2$$

Legend: $(\sigma_5)^2$ = variance of the attitude scores of the informal group towards the environment.

$(\sigma_5')^2$ = variance of the post-attitude scores of the treatment group towards the environment.

General Hypothesis VI

Students taking part in an informal outdoor experience will not show a positive attitude toward their teachers, when compared to the attitudes of students who completed an environmental education program utilizing outdoor education procedures.

Symbolically -

$$H_0: (\sigma_6)^2 = (\sigma_6')^2$$

$$H_1: (\sigma_6)^2 \neq (\sigma_6')^2$$

Legend: $(\sigma_6)^2$ = variance of the attitude scores of the informal group towards their teachers.

$(\sigma_6')^2$ = variance of the post-attitude scores of the treatment group towards their teachers.

Summary

The study involved three groups of students: a control group made up of 25 Grade XI students each, who had voluntarily opted for Biology 200, and an informal group of Grade X, XI, XII students who were members of the Outdoor Club. The control group was given a 12-day environmental education program in the classroom, and the treatment group was given a 12-day environmental education program utilizing outdoor education procedures. The informal group participated in an informal, extracurricular, outdoor education, life-skills recreational program.

The control and treatment groups were pre-tested and post-tested for changes in attitude (towards school, their teachers, the environment, and self-concept), and for the acquisition of content material in environmental studies. The informal group was examined for positive attitudes towards the environment, school, teachers, and self-concept.

Tests of significance were conducted for changes within groups and between the control and treatment groups. The informal group was compared to the post-test results of the treatment group.

This chapter described the instruments developed by the researcher and the tests of significance used to test the reliability of the instruments. The instruments used to analyze the data were also described. The hypotheses included were as follows:

General Hypothesis I. Students taught environmental education, utilizing outdoor education procedures, will show no significant change in attitude when compared to students taught environmental education in the classroom.

General Hypothesis II. Students taught environmental education utilizing outdoor education procedures, will show no significant improvement in academic scores in biology class when compared to students taught environmental education in the classroom.

General Hypothesis III. Students taking part in an informal outdoor experience will not show a positive self-concept, when compared to the attitudes of students who completed an environmental education program utilizing outdoor education procedures.

General Hypothesis IV. Students taking part in an informal outdoor experience will not show a positive attitude toward their school, when compared to the attitudes of students who completed an environmental education program utilizing outdoor education procedures.

General Hypothesis V. Students taking part in an informal outdoor experience will not show a positive attitude toward their environment, when compared to the attitudes of students who completed an environmental education program utilizing outdoor education procedures.

General Hypothesis VI. Students taking part in an informal outdoor experience will not show a positive attitude toward their teachers, when compared to the attitudes of

students who completed an environmental education program utilizing outdoor education procedures.

CHAPTER IV

ANALYSIS OF THE DATA

Procedure

A t-test for significance of paired data was used to test the hypotheses involving student attitude changes within a group. The t-test for unpaired data and an F test for variances between unpaired data were used to test the hypothesis concerning change of attitude between groups. To test the hypothesis on cognitive learning, a t-test for unpaired data was employed. The hypotheses on measurement of positive attitudes of the group were subjected to a Z test of significance of proportions and to an F test of analysis of the variances by comparing the informal group to the post-test results of the treatment group.

ResultsHypothesis I

Students taught environmental education utilizing outdoor education procedures, will show no significant change in attitude when compared to students taught environmental education in the classroom.

Analysis of data of specific hypotheses - Ii, page 79; Ij, page 80; Ik, page 80; and Il, page 83 indicate that the obtained values of 't' (see Table 4.4) were not significant.

The researcher, in order to verify the results of the t-test for a difference between two independent means, performed an F test for differences between variances of two independent samples. The resulting F scores obtained did not exceed the theoretical F values, and therefore supported the results of the t-test for differences between two independent means. The F score results are given in Table 4.1.

Therefore, the hypothesis was not rejected. This was interpreted to mean that the environmental program taught by utilizing outdoor education procedures, did not significantly change student attitudes when compared to an environmental education program taught in a classroom.

Hypothesis 1a

Students taught environmental education in the classroom will not show a significant change in attitude towards their school, upon completion of the program.

The mean score of the pre-test for attitude towards school was 78.4000. The mean score of the post-test was 79.000. The data produced a $t = .4229$ with 24 degrees of freedom. The obtained 't' was less than the critical theoretical $t = -.797$ at a .01 level of confidence. Therefore, the hypothesis was not rejected at the .01 level of confidence. This was interpreted to mean that the environmental program taught in the classroom did not significantly change student attitudes toward the school. The results are summarized in Table 4.2 and are depicted in Figure 4.1.

TABLE 4.1

Results of the 'F' Test for Differences Between Variances of Independent Pre-/Post-Tests for Attitude Performed on the Treatment and Control Groups

Attitude Toward	Control		Treatment		d.f.	Critical 'F' Value 1% level	Obtained 'F' Value	Significant Result
	s.d.	Variance	s.d.	Variance				
School	6.9924	48.89	7.0304	49.45	24/24	2.66	1.01	No
Self-Concept	7.0119	49.17	10.2288	104.63	24/24	2.66	2.13	No
Teachers	7.4079	54.88	9.9460	98.92	24/24	2.66	1.8	No
Environment	5.3784	28.93	7.9565	63.31	24/24	2.66	2.19	No

Hypothesis Ib

Students taught environmental education in the classroom will not show a significant change in their self-concept upon completion of the program.

The mean score of the pre-test for self-concept was 77.8400. The mean score of the post-test was 79.7600. The data produced a $t = 2.797$ at a .01 level of confidence. Therefore the hypothesis was not rejected at the .01 level of confidence. This was interpreted to mean that the environmental program taught in the classroom did not significantly change their self-concept. The results are summarized in Table 4.2, and are depicted in Figure 4.1.

Hypothesis Ic

Students taught environmental education in the classroom will not show a significant change in attitude towards their teachers upon completion of the program.

The mean score of the pre-test for attitude towards teachers was 82.4000. The mean score of the post-test was 85.5200. The data produced a $t = 2.0010$ with 24 degrees of freedom. The obtained 't' was less than the critical theoretical $t = 2.797$ at a .01 level of confidence. Therefore, the hypothesis was not rejected at the .01 level of confidence. This was interpreted to mean that the environmental program taught in the classroom did not significantly change

student attitudes towards their teachers. The results are summarized in Table 4.2 and are depicted in Figure 4.1.

However, when submitted to analysis at a .06 level of confidence, the obtained $t = 2.0010$ was found to be greater than the critical theoretical $t = 1.991$ ($\alpha = .06$).

Hypothesis Id

Students taught environmental education in the classroom will not show a significant change in attitude towards the environment, upon completion of the program.

The mean score of the pre-test for attitude towards the environment was 100.5600. The mean score of the post-test was 107.0400. The data provided a $t = 6.0241$ with 24 degrees of freedom. The obtained 't' was greater than the critical theoretical $t = 2.7970$ at the .01 level of confidence. Therefore, the hypothesis was rejected at the .01 level of confidence. This was interpreted to mean that the environmental program taught in the classroom did significantly change student attitudes towards the environment. The results are summarized in Table 4.2, and are depicted in Figure 4.1.

Hypothesis Ie

Students taught environmental education utilizing outdoor education procedures, will not show a significant change in attitude towards their school, upon completion of the program.

The mean score of the pre-test for attitude towards school was 78.5200. The mean score of the post-test was 82.7200. The data produced a $t = 2.9216$ with 24 degrees of freedom. The obtained 't' was greater than the critical theoretical $t = 2.797$ at a .01 level of confidence. Therefore, the hypothesis was rejected at the .01 level of confidence. This was interpreted to mean that the environmental program taught by utilizing outdoor education procedures, did significantly change student attitudes towards their school. The results are summarized in Table 4.3 and are depicted in Figure 4.2.

Hypothesis If

Students taught environmental education utilizing outdoor education procedures, will not show a significant change in their self-concept.

The mean score of the pre-test for self-concept was 80.4400. The mean score of the post-test was 83.2400. The data produced a $t = 1.9966$ with 24 degrees of freedom. The obtained 't' was less than the critical theoretical $t = 2.797$ at a .01 level of confidence. Therefore, the hypothesis was not rejected at the .01 level of confidence. This was interpreted to mean that the environmental program taught by utilizing outdoor education procedures did not significantly change their self-concept. The results are summarized in Table 4.3, and are depicted in Figure 4.2.

TABLE 4.2

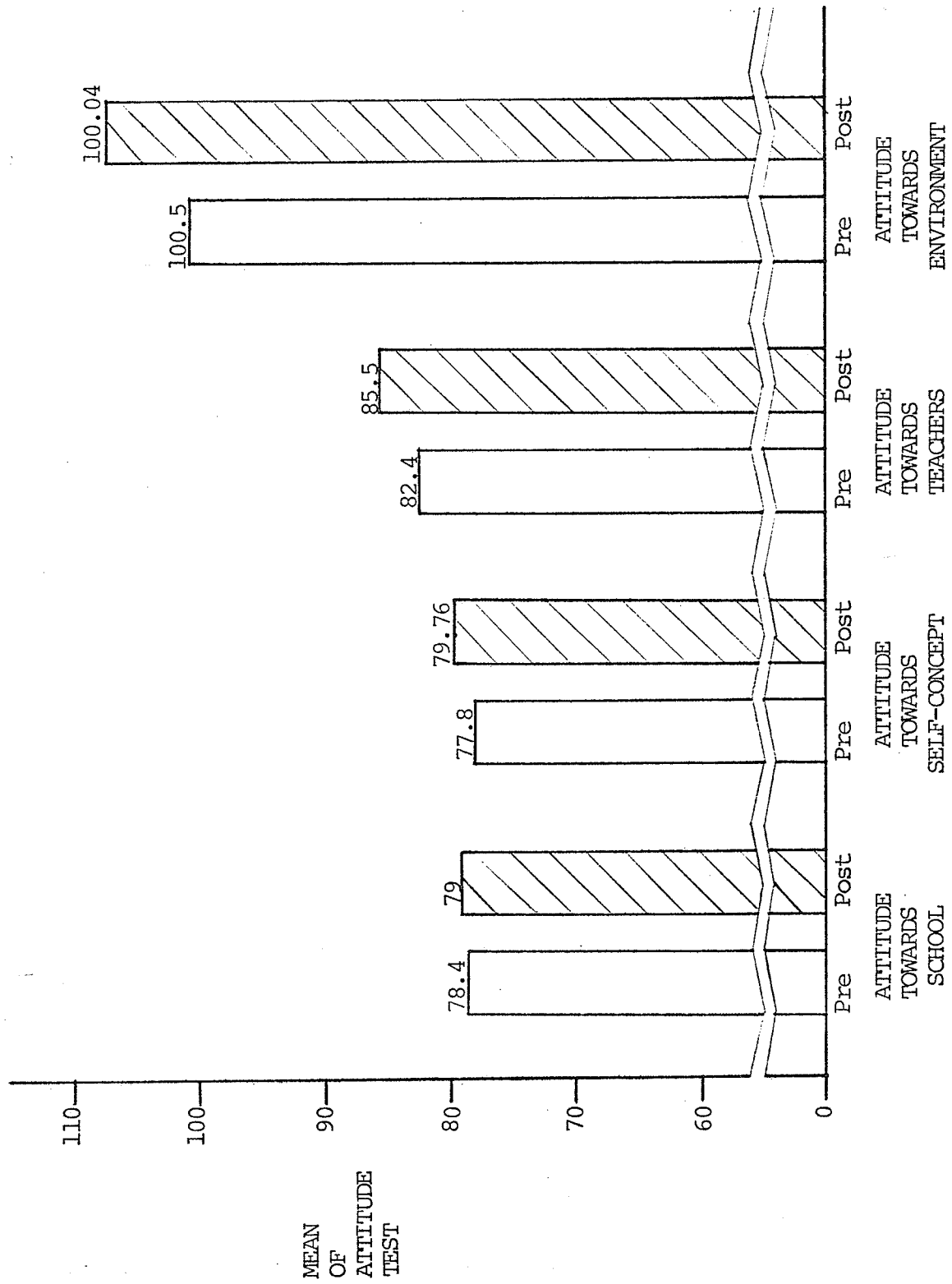
**Tests of Significance:
Student Attitude Changes upon Completion of an
Environmental Education Program Taught in the Classroom**

Attitude Toward	N	Mean of Pre-test	Mean of Post-Test	Mean of Differences	Standard Deviation of Differences	Standard Error	Critical Theoretical t'_{α} *	Obtained t'	Significant Results
School	25	78.4000	79.0000	-0.6000	7.0946	1.4189	$\alpha = 0.01$ 2.797	0.4229	$\alpha = 0.01$ No
Self-Concept	25	77.8400	79.7600	-1.9200	10.0288	2.0058	$\alpha = 0.01$ 2.797 $\alpha = 0.1$ 1.721	0.9572	$\alpha = 0.01$ No $\alpha = 0.1$ No
Teachers	25	82.4000	85.5200	-3.1200	7.7959	1.5592	$\alpha = 0.01$ 2.797 $\alpha = 0.06$ 1.991	2.0010	$\alpha = 0.01$ No $\alpha = 0.06$ Yes
Environment	25	100.5600	107.0400	-6.4800	5.3784	1.0757	$\alpha = 0.01$ 2.797	6.0241	$\alpha = 0.01$ Yes

* with 24 degrees of freedom.

FIGURE 4.1

A Comparison of Pre-Post- Test Means of Students' Attitudes: Control Group Receiving Classroom Instruction



However, when submitted to analysis at a .06 level of confidence, a $t = 1.9966$ was obtained. This value of 't' was greater than the critical theoretical $t = 1.991$ ($\alpha = .06$).

Hypothesis Ig

Students taught environmental education utilizing outdoor education procedures, will not show a significant change in attitude towards their teachers.

The mean score of the pre-test for attitude towards their teachers was 80.7600. The mean score of the post-test was 84.3200. The data produced a $t = 1.7897$ with 24 degrees of freedom. The obtained 't' was less than the critical theoretical $t = 2.797$ at a .01 level of confidence. Therefore, the hypothesis was not rejected at the .01 confidence level. This was interpreted to mean that the environmental program taught by utilizing outdoor education procedures did not significantly change student attitudes towards their teachers. The results are summarized in Table 4.3, and are depicted in Figure 4.2.

However, when submitted to analysis at the .09 level of confidence, the obtained $t = 1.7897$ was greater than the critical theoretical $t = 1.781$ ($\alpha = .09$).

Hypothesis Ih

Students taught environmental education utilizing outdoor education procedures, will not show a significant change

TABLE 4.3

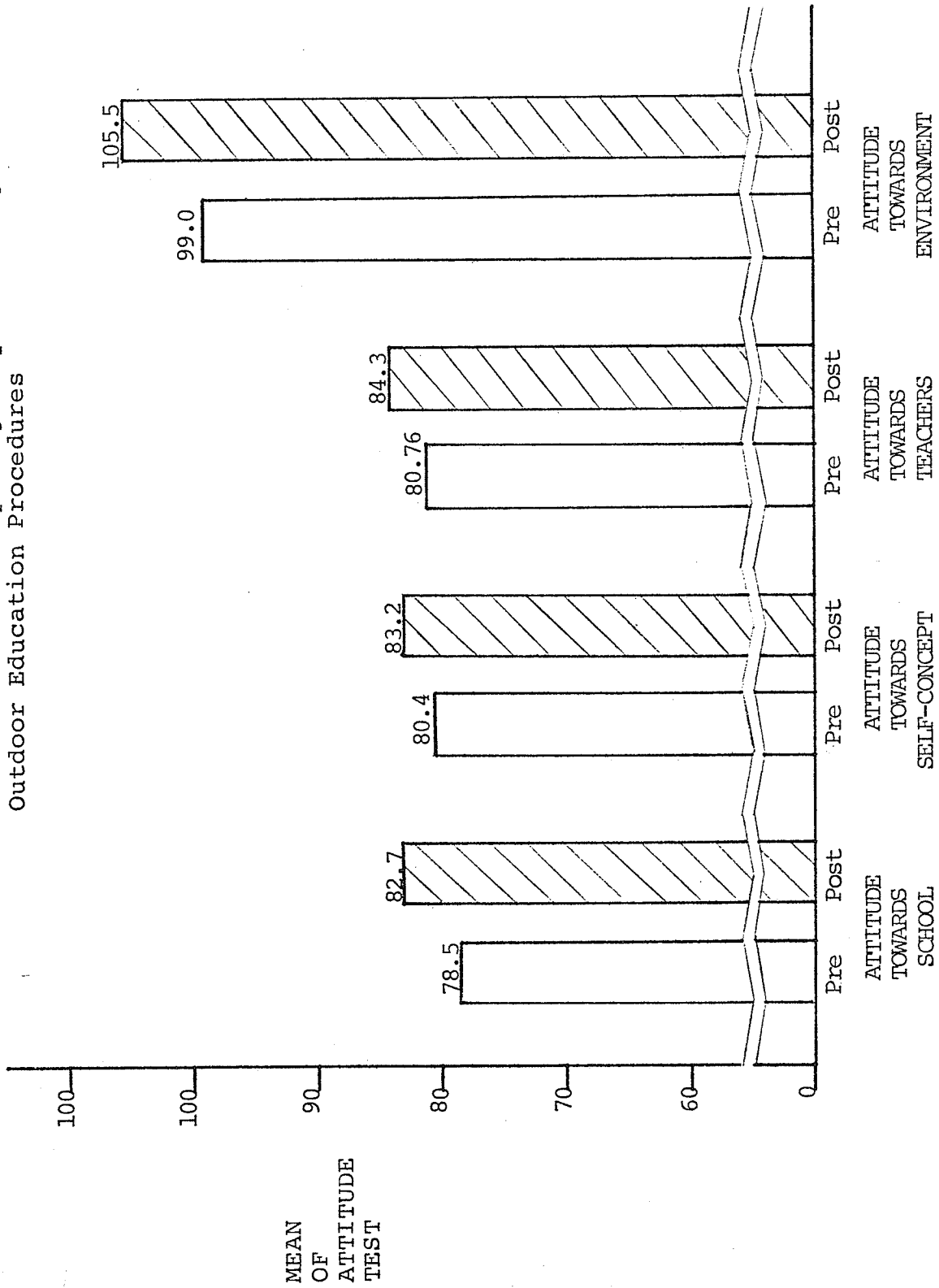
Tests of Significance:
Student Attitude Changes upon Completion of an
Environmental Education Program Taught by Utilizing Outdoor Education Procedures

Attitude Toward	N	Mean of Pre-test	Mean of Post-test	Mean of Differences	Standard Deviation of Differences	Standard Error	Critical Theoretical t' *	Obtained t'	Significant Results
School	25	78.5200	82.7200	-4.2000	7.1880	1.4376	$\alpha = 0.01$ 2.797	2.9216	$\alpha = 0.01$ Yes
Self-Concept	25	80.4400	83.2400	-2.800	7.0119	1.4024	$\alpha = 0.01$ $\frac{2.797}{\alpha = 0.06}$ 1.991	1.9966	$\alpha = 0.01$ No $\alpha = 0.06$ Yes
Teachers	25	80.7600	84.3200	-3.5600	9.9460	1.9892	$\alpha = 0.01$ $\frac{2.797}{\alpha = 0.09}$ 1.781	1.7897	$\alpha = 0.01$ No $\alpha = 0.09$ Yes
Environment	25	99.0000	105.5600	-6.5600	8.3968	1.6794	$\alpha = 0.01$ 2.797	3.9062	$\alpha = 0.01$ Yes

* with 24 degrees of freedom.

FIGURE 4.2

A Comparison of Pre-Post- Test Means of Students' Attitudes: Treatment Group Taught By Utilizing Outdoor Education Procedures



in attitude towards the environment.

The mean score of the pre-test for attitude towards the environment was 99.0000. The mean score of the post-test was 105.5600. The data produced a $t = 3.9062$, with 24 degrees of freedom. The obtained 't' was greater than the critical theoretical $t = 2.797$ at a .01 level of confidence. Therefore, the hypothesis was rejected at the .01 confidence level. This was interpreted to mean that the environmental program taught by utilizing outdoor education procedures, did not significantly change student attitudes towards the environment. The results are summarized in Table 4.3 and are depicted in Figure 4.2.

Hypothesis Ii

Students taught environmental education utilizing outdoor education procedures, will show no significant change of attitude toward their school when compared to students taught environmental education in the classroom.

The mean score of the differences between the pre-test and the post-test for the treatment group was 4.5200. The mean score of the differences between the pre-test and the post-test for the control group was 1.3200. The data produced a $t = 1.614$ with 48 degrees of freedom. The obtained 't' was less than the critical theoretical $t = 2.682$ at a .01 level of confidence. Therefore, the hypothesis was not rejected at the .01 confidence level. This was interpreted to mean that the environmental program taught by utilizing outdoor education procedures

did not significantly change student attitudes towards their school. The results are summarized in Tables 4.1 and 4.4.

Hypothesis Ij

Students taught environmental education utilizing outdoor education procedures, will show no significant change in their self-concept when compared to students taught environmental education in the classroom.

The mean score of the differences between the pre-test and the post-test for the treatment group was 1.9200. The mean score of the differences between the pre-test and post-test for the control group was 2.8. The data produced a $t = 0.360$ with 48 degrees of freedom. The obtained 't' was less than the critical theoretical $t = 2.682$ at a .01 level of confidence. Therefore, the hypothesis was not rejected at the .01 confidence level. This was interpreted to mean that the environmental program taught by utilizing outdoor education procedures did not significantly change the students' self-concept. The results are summarized in Tables 4.1 and 4.4.

Hypothesis Ik

Students taught environmental education utilizing outdoor education procedures, will show no significant change of attitude toward their teachers when compared to students taught environmental education in the classroom.

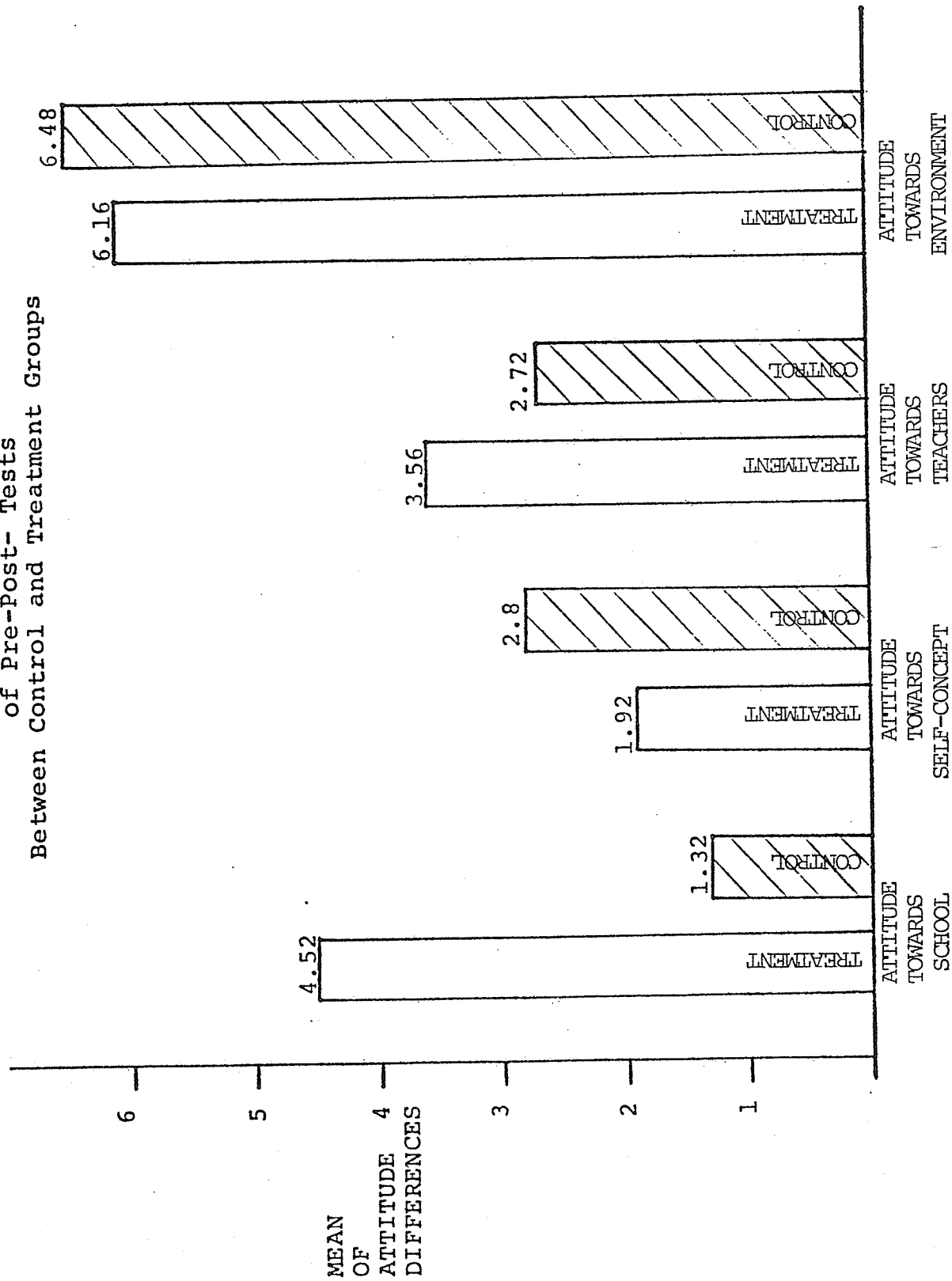
TABLE 4.4

**Tests of Significance:
A Comparison of Student Pre-Test and Post-Test Differences
Obtained from Attitude Tests**

Attitude Toward	Treatment Mean	Control Mean	Standard Deviation		Standard Error		df	Critical Theoretical 't' at 0.01 Level	Obtained 't'	Significant Result at = 0.01
			Treatment	Control	Treatment	Control				
School	4.5200	1.3200	7.0304	6.9924	1.4061	1.3985	48	2.682	1.614	No
Self-Concept	1.9200	2.8000	10.0288	7.0119	2.0058	1.4024	48	2.682	0.360	No
Teachers	3.5600	2.7200	9.9460	7.4079	1.9892	1.4816	48	2.682	0.339	No
Environment	6.1600	6.4800	7.9565	5.3784	1.5913	1.0757	48	2.682	0.167	No

FIGURE 4.3

A Comparison of Means of Differences
Of Pre-Post- Tests
Between Control and Treatment Groups



The mean score of the differences between the pre-test and the post-test for the treatment group was 3.5600. The mean score of the differences between the pre-test and the post-test for the control group was 2.7200. The data produced a $t = 0.339$ with 48 degrees of freedom. The obtained 't' was less than the critical theoretical $t = 2.682$ at a .01 level of confidence. Therefore, the hypothesis was not rejected at the .01 confidence level. This was interpreted to mean that the environmental program taught by utilizing outdoor education procedures, did not significantly change student attitudes towards their teachers. The results are summarized in Tables 4.1 and 4.4.

Hypothesis II

Students taught environmental education utilizing outdoor education procedures, will show no significant change of attitude toward the environment when compared to students taught environmental education in the classroom.

The mean score of the differences between the pre-test and the post-test for the treatment group was 6.1600. The mean score of the differences between the pre-test and the post-test for the control group was 6.4800. The data produced a $t = 0.167$ with 48 degrees of freedom. The obtained 't' was less than the critical theoretical $t = 2.682$ at a .01 level of confidence. Therefore, the hypothesis was not rejected at the .01 confidence level. This was interpreted to mean that the environmental program taught by utilizing outdoor education

procedures, did not significantly change student attitudes towards the environment when compared to students taught environmental education in the classroom. The results are summarized in Tables 4.1 and 4.4.

General Hypothesis II

Students taught environmental education utilizing outdoor education procedures, will show no significant improvement in cognitive learning in biology class when compared to students taught environmental education in the classroom.

The mean score of the differences between the pre-test and the post-test for the control group was 8.1280. The mean score of the differences between the pre-test and the post-test for the treatment group was 12.1920. The data produced a $t = 3.528$ with 48 degrees of freedom. The obtained 't' was greater than the critical theoretical $t = 2.682$ at a .01 level of confidence. Therefore, the hypothesis was rejected at the .01 confidence level. This was interpreted to mean that the environmental education program utilizing outdoor education procedures produced a significant improvement in academic scores when compared to academic scores of students taught environmental education in the classroom. The results are summarized in Table 4.5.

General Hypothesis III

Students taking part in an informal outdoor experience

TABLE 4.5

Test of Significance
 A Comparison of Student Pre-Test to Post-Test Differences in Cognitive Scores
 in the Environmental Education Program

Treatment Mean	Control Mean	Standard Deviation		Standard Error		d.f.	Critical 't'	Obtained 't'	Significant Result
		Treatment	Control	Treatment	Control				
12.1920	8.1280	3.8664	4.2700	.7733	.8540	48	2.682	3.528	Yes

will not show a positive self-concept, when compared to the attitudes of students who completed an environmental education program utilizing outdoor education procedures.

The proportion (p) of students in the informal group who attained a score greater than 75 in their attitude test of self-concept was .92. The proportion (P) of students in the treatment group who attained a post-test attitude score greater than 75 was .76. The data produced a 'Z' score of 1.93 which was less than the critical theoretical 'Z' score of 1.96 at a .05 level of confidence. This was interpreted to mean that the attitude towards their school of the students in the informal outdoor education program did not differ significantly from the positive post-test attitudes of the treatment group. The results are summarized in Table 4.6.

The variance of the informal group's self-concept was 94.1875. The variance of the post-test attitudes of the treatment group was 123.7723. When subjected to an F-test of significance for differences between variances of two independent samples (the informal group and treatment group), an 'F' value of 1.31 was obtained. This was less than the critical theoretical 'F' value of 2.62 with 24/25 degrees of freedom, corrected to the .02 level of confidence. The results indicated that the variances were homogeneous. Therefore, the hypothesis was rejected. This was interpreted to mean that the students in the informal group had a positive self-concept when compared to the post-test attitudes

of the treatment group. The results are summarized in Table 4.7.

General Hypothesis IV

Students taking part in an informal outdoor experience will not show a positive attitude toward their school, when compared to the attitudes of students who completed an environmental education program utilizing outdoor education procedures.

The proportion (p) of the students in the informal group who attained a score greater than 75 in their attitude test toward school, was .85. The proportion (P) of students in the treatment group who attained a post-test attitude score greater than 75 was .76. The data produced a 'Z' score of 1.08, which was less than the critical theoretical 'Z' score of 1.96 at a .05 level of confidence. This was interpreted to mean that the attitudes towards their school of the students in the informal outdoor education program did not differ significantly from the positive post-test attitudes of the treatment group. The results are summarized in Table 4.6.

The variance of the informal group's attitude towards their school was 98.8275. The variance of the post-test attitudes of the treatment group was 156.4601. When subjected to an F test of significance for differences between variances of two independent samples (the informal group and the treatment group), an 'F' value of 1.58 was obtained. This was less

than the critical theoretical 'F' value of 2.62 with 24/25 degrees of freedom, corrected to the .02 level of confidence. The results indicated that the variances were homogeneous. Therefore, the hypothesis was rejected. This was interpreted to mean that the students in the informal group had a positive attitude toward their school when compared to the post-test attitudes of the treatment group. The results are summarized in Table 4.7.

General Hypothesis V

Students taking part in an informal outdoor experience will not show a positive attitude toward their environment when compared to the attitudes of students who completed an environmental education program utilizing outdoor education procedures.

The proportion (p) of the students in the informal group who attained a score greater than 75 in their attitude test toward the environment was 1.0. The proportion (P) of students in the treatment group who attained a post-test attitude score greater than 75 was 1.0. The data produced a 'Z' score of 0, which was less than the critical theoretical 'Z' score of 1.96 at a .05 level of confidence. This was interpreted to mean that the attitudes towards the environment of the students in the informal outdoor education program did not differ significantly from the positive post-test attitudes of the treatment group. The results are summarized in Table 4.6.

The variance of the informal group's attitude towards the environment was 56.5200. The variance of the post-test attitudes of the treatment group was 73.2600. When subjected to an F test of significance for differences between variances of two independent samples (the informal group and the treatment group), an 'F' value of 1.58 was obtained. This was less than the critical theoretical 'F' value of 2.62 with 24/25 degrees of freedom, corrected to the .02 confidence level. The results indicated that the variances were homogeneous. Therefore, the hypothesis was rejected. This was interpreted to mean that the students in the informal group had a positive attitude toward their environment when compared to the post-test attitudes of the treatment group. The results are summarized in Table 4.7.

General Hypothesis VI

Students taking part in an informal outdoor experience will not show a positive attitude towards their teachers when compared to the attitudes of students who completed an environmental education program utilizing outdoor education procedures.

The proportion (p) of the students in the informal group who attained a score greater than 75 in their attitude test toward their teachers was .69. The proportion (P) of students in the treatment group who attained a post-test attitude score greater than 75 was .80. The data produced a 'Z' score of 1.41, which was less than the critical theoretical 'Z' score of 1.96 at a .05 level of confidence. This

was interpreted to mean that the attitudes towards their teachers of the students in the informal outdoor education program, did not differ significantly from the positive post-test attitudes of the treatment group. The results are summarized in Table 4.6.

The variance of the informal group's attitude towards their teachers was 166.1550. The variance of the post-test attitudes of the treatment group was 180.725. When subjected to an F test of significance for differences between variances of two independent samples (the informal group and the treatment group), an 'F' value of 1.09 was obtained. This was less than the critical 'F' value of 2.62 with 24/25 degrees of freedom, corrected to the .02 confidence level. The results indicated that the variances were homogeneous. Therefore, the hypothesis was rejected. This was interpreted to mean that the students in the informal group had a positive attitude toward their teachers when compared to the post-test attitudes of the treatment group. The results are summarized in Table 4.7.

Summary

The attitudes of the control group and the treatment group were measured with the attitude test, on a pre- post-test basis. The attitudes of the informal group were measured with the same attitude test. The hypotheses involving the

TABLE 4.6

Test of Significance:
The Relationship of Proportions of Positive Attitudes Between
the Informal Group and the Treatment Group

Attitude Toward	No. of Students Scoring 75		Total No. of Students		p	P	Critical 'Z' Value = 0.05	Obtained 'Z' Score	Significant Difference
	Informal Group	Treatment Group	Informal Group	Treatment Group					
School	22	19	26	25	0.85	0.76	1.96	1.08	No
Self-Concept	24	19	26	25	0.92	0.76	1.96	1.93	No
Teachers	18	20	26	25	0.69	0.80	1.96	1.41	No
Environment	26	25	26	25	1.0	1.0	1.96	0.0	No

TABLE 4.7

Test of Significance:
 A Comparison of the Variances Between the Attitudes
 of the Informal Group and the Post-Test Attitudes of the Treatment Group

Attitude Toward	Informal Group		Treatment Group		Critical F Value = 0.01	Obtained F Value*	Significant Differences	
	Mean	s d.	Mean	s d.				
School	87.8846	9.9412	82.7200	12.5084	156.4601	2.62	1.58	No
Self- Concept	87.7692	9.7050	83.2400	11.1253	123.7723	2.62	1.31	No
Teachers	85.9231	12.8901	84.3200	13.4434	180.725	2.62	1.09	No
Environ- ment	106.9615	7.5180	105.5600	8.5590	73.2600	2.62	1.30	No

* with 24/25 degrees of freedom

change of attitudes within and between the control and treatment groups, were tested for significance using t-tests. The differences in attitude change between the control and treatment groups were also submitted to an F test of significance. The hypotheses comparing the attitudes of the informal group to the post-test attitude scores of the treatment group were tested for significance using a Z test for significance of a proportion and an F test. The hypothesis involving the comparison of the degree of cognitive learning between the control and treatment tests was tested using a t-test.

The results indicated that students taught utilizing outdoor education procedures do not undergo a significant change in attitude when compared to students taught in the classroom.

The data further indicated that students taught environmental education in a classroom did not undergo a significant change of attitudes towards their school, teachers, or in self-concept. However, they did record a significant change in attitude towards the environment.

The results also indicated that students taught environmental education utilizing outdoor education procedures did record a significant change in attitude towards their school and the environment. They did not record a significant change in attitude towards their teachers nor a change in self-concept.

The data also indicated that students taught utilizing

outdoor education procedures recorded a significant improvement in cognitive learning when compared to students taught in the classroom.

The results further indicated that the students given an informal outdoor education experience had a positive attitude to their school, teachers, the environment, and a positive self-concept, when compared to the post-test attitudes of the treatment group.

These results are summarized in Tables 4.8, 4.9 and 4.10 which follow.

TABLE 4.8

Summary of Significant Attitude Changes
General Hypothesis I

Students taught environmental education, utilizing outdoor education procedures, will show no significant change in attitude when compared to students taught environmental education in the classroom.

Change in Attitudes Towards	Groups Compared	Control vs. Treatment	Pre- Post-Test Changes	
			Within Control Group	Within Treatment Group
School		No	No	Yes
Self-concept		No	No	No
Teachers		No	No	No
Environment		No	Yes	Yes

TABLE 4.9

Summary of Significant Cognitive Score Changes
between Treatment and Control Groups
General Hypothesis II

Test Area	Groups Compared	Control vs. Treatment
Cognitive Learning		Yes

TABLE 4.10

Summary of Comparisons in Attitudes
between Informal and Treatment Groups
General Hypotheses III, IV, V, VI

Changes in Attitude Towards	Groups Compared	Informal vs. Treatment (Significant Difference Between)	Positive Attitude of Informal Group Indicated
School		No	Yes
Self-concept		No	Yes
Teachers		No	Yes
Environment		No	Yes

CHAPTER V

SUMMARY, CONCLUSIONS, DISCUSSIONS, RECOMMENDATIONS
and
IMPLICATIONS FOR EDUCATIONAL PRACTICE

Summary

The capacity to change attitudes and increase academic scores are values attributed to an outdoor education program. A review of the literature has shown that there is a need to provide empirical data concerning how an outdoor education program, as part of the curriculum, can affect concepts, attitudes and emotions. Research had indicated that changes occur in students involved in residential experiences, and in students at the elementary, junior high level. This study examined changes in attitude and cognitive learning in senior high students exposed to non-residential outdoor education teaching processes, and the changes in attitude and cognitive learning occurring in classroom teaching. A measure of attitudes of students in an informal, extracurricular outdoor education program was undertaken.

An attitude test, containing 100 items and measuring self-concept, attitudes towards school, teachers and the environment, was constructed. Content validity and reliability were established. The test was administered to two classes of Grade XI biology students, and to an extracurricular

Outdoor Club which was made up of students from Grades X, XI and XII. The two biology classes then received an environmental education program; the control group was taught in the classroom and the treatment group was taught outside the classroom. They were then given the post-test for attitude. A cognitive test on environmental content (25 items) was also constructed and administered to both groups prior to, and immediately after, the experimental period.

Changes within the control group and treatment group were tested for significance by a t-test for related data. Changes between the two groups were tested by a t-test and an F test for unpaired data. The measurement of positive attitudes of the informal group (Outdoor Club) was compared to the post-test attitudes of the treatment group employing a Z test of significance of proportions and an F test of analysis of variance.

Summary of Major Findings

The analysis of the data resulted in the following summary:

1. An environmental education program taught by utilizing outdoor education procedures, did not significantly change student attitudes when compared to an environmental education program taught in the classroom.
2. An environmental education program taught in the

classroom did not significantly change students' attitudes toward their school.

3. An environmental education program taught in the classroom did not significantly change students' attitudes towards their teachers.

4. An environmental education program taught in the classroom did not significantly change students' self-concept.

5. An environmental education program taught in the classroom did significantly change students' attitudes towards the environment.

6. An environmental education program taught utilizing outdoor education procedures did significantly change students' attitudes towards their school.

7. An environmental education program taught utilizing outdoor education procedures did not significantly change students' attitudes towards their teachers.

8. An environmental education program taught utilizing outdoor education procedures did not significantly change students' self-concept.

9. An environmental education program taught utilizing outdoor education procedures did significantly change students' attitudes towards the environment.

10. Teaching environmental education in a classroom does differ significantly from teaching an environmental education program by utilizing outdoor education procedures in their ability to facilitate cognitive learning.

11. Students in an informal outdoor education program displayed a positive self-concept.

12. Students in an informal outdoor education program displayed a positive attitude towards their school.

13. Students in an informal outdoor education program displayed a positive attitude towards their teachers.

14. Students in an informal outdoor education program displayed a positive attitude towards the environment.

Conclusions

General Hypothesis I

The analysis of the data indicated that there was no significant difference in the change of attitude within the control group in the areas of self-concept, attitudes towards school and teachers. There was, however, a statistically significant difference in a change in attitude towards the environment, within the control group.

The treatment group also displayed no significant change in the area of self-concept and in attitudes towards teachers. Within the treatment group, however, a statistically significant difference occurred in the change of attitude towards school and towards the environment.

The statistical analysis performed indicated that there were no significant differences between the control and treatment groups, with regard to change in self-concept

and attitudes towards school, teachers and the environment.

The change in attitude towards school displayed within the treatment group alone, may be due to several factors such as:

- those students in the biology program may have an interest in ecology which allows them to respond favorably to the teaching methods in the outdoors;
- the time of the year for the study may have taken advantage of the fact that students were eager and happy to be outdoors;
- both the students and the teacher may have displayed an enthusiasm for the change in program.

Although there was no statistically significant change indicated between the control and treatment groups in attitude towards the environment, both groups had shown a change within each respective group. Therefore, the results have indicated that teaching the content of environmental concerns brought about a significant change in attitude towards the environment. However, the process by which it was taught (indoors vs. outdoors) was not a factor in this study. It may also be concluded that teaching out-of-doors is not detrimental to the changing of attitudes when compared to traditional classroom teaching and may actually increase a student's interest in school.

General Hypothesis II

The statistical analysis of the cognitive gain of the

students on the pre- post-test comparison between the treatment and control groups indicated that there was a statistically significant difference in the results. This statistically significant result was in favour of the treatment group.

The results may be due to the enthusiasm of the students and the instructor for being out-of-doors and in being involved in a different teaching process. It may be concluded that the process of teaching out-of-doors was not detrimental to cognitive learning, and did actually significantly increase cognitive scores.

General Hypotheses III, IV, V, VI

The statistical analysis of the comparisons of attitudes between the informal group and the treatment group showed that there was no statistically significant difference. Both groups exhibited a positive self-concept and a positive attitude towards school, their teachers and the environment. The researcher concludes that students involved in an informal outdoor education program will exhibit the same positive self-concepts, attitudes towards school, their teachers and their environment, as those students who have undergone a planned, formal outdoor education experience. It can be further stated that there is a value to be gained from the informal outdoor education experience and that there should be the opportunity for students to participate in a voluntary, extracurricular outdoor education experience.

Recommendations to Educators

A review of the literature has suggested that attitude changes occur in students when they are exposed to an outdoor education program in a residential camping experience. The research conducted in this study suggests that, although it was possible to change attitudes within groups (a) within the control group, attitude toward the environment was changed, (b) within the treatment group, attitudes towards school and the environment were changed), there was not a significant change in attitudes between teaching inside the classroom as opposed to teaching outside the classroom. Therefore, as a result of this study, the researcher cannot state that one method of teaching environmental education was significantly different to the other for changing attitudes. However, it is evident that it was possible to change attitudes toward the environment by exposing students to the subject and that content, rather than the teaching process, was the important factor.

When the researcher examined the area of cognitive learning, he concluded that the teaching of environmental education, using the process of outdoor education, did increase cognitive learning to a level significantly different from that achieved by the control group which received all of their instruction in the classroom. Therefore, the result is significant in that teachers can confidently say that teaching outside the classroom does not lower the

efficiency of teaching content and does, in fact, increase and enhance the learning process. In the past, teachers have relied on their own feelings and observations to support this view; this study adds to their observations by providing significant conclusions based on direct measurements of the students themselves.

In addition, the examination of the attitudes of the informal group leads to the conclusion that extracurricular outdoor activities, such as those experienced by the informal group, do have a significant influence on the attitudes of the participants. These attitudes compared favorably to the attitudes of the students involved in the environmental outdoor education program.

It is hoped that this research will make it easier for teachers to obtain support for both informal and formal outdoor education experiences. Criticism that outdoor education is a "frill," is "too costly for what it accomplishes," is "too time-consuming," might be defended against. Perhaps administrators and school boards might be inclined to view outdoor education as a valuable teaching alternative. With this in mind, they may allow for the funding of programs as they do for any other academic subject or teaching style. Most schools have budgets, with central funding, that allows for the purchase of teaching aids and materials. If outdoor education is a valuable tool in the teaching process, then it too should be centrally funded, as many outdoor education

teachers will agree that a great deal of their time is spent on fund raising (which they do not have to do for their other academic subjects).

This research should indicate to teachers that they are not sacrificing valuable school time when they take their students out of the classroom. Academic skills can be taught, and knowledge gained by students in a different atmosphere. It is not an "either-or" situation: "either we stay indoors and learn or we go outside and have fun." Students can go out-of-doors, have an enjoyable experience and still gain academic skills.

Areas for Further Study

This researcher did not examine the gain in environmental knowledge through an informal process. It would be valuable to obtain data on a pre- post-testing of an extra-curricular group of students, as to their cognitive learning.

A further area of study might be to examine the attitudes of the participants (both control and treatment groups) a full year after they had left the school. Perhaps, in this manner, a study of the retention of the cognitive learning could be evaluated, and a comparison made on the basis of indoor versus outdoor instruction.

This research was based on a high school program operating from a school. A review of the literature has indicated that residential programs for elementary students

have been instrumental in changing attitudes. Outdoor education might be further served by providing research data on the effect of a residential program on high school students.

A study of various content areas, such as mathematics, social studies or language arts should be undertaken. It may be that these content areas might produce different results in a research study when compared to the environmental education covered in this research study.

A further refinement of this particular research study may be to examine the instruction methods of the teacher and to vary the classroom teaching techniques used, and to examine the responses and attitude changes of males as compared to females.

It is the hope of the researcher that the conclusions and research data examined in this study will provide a basis from which other research programs can begin. The implication from this study is that much further research on attitude change and cognitive learning in the out-of-classroom situation is required.

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APPENDIX A

OUTDOOR EXPERIENCE SURVEY

Grade _____ Age _____ Male _____
 Female _____

Part A

<u>Question</u>	<u>Percentage Response</u>	
	<u>Yes</u>	<u>No</u>
1. Do you go camping?	79%	21%
2. If yes, with your family?	56.5	43.5
3. If yes, with your friends?	81.5	18.5
4. How long do you spend each time?		
- 1 day	14.6	
- weekend	72.3	
- one week	41.5	
- two weeks	30.3	
- more than 2 weeks	20	
5. When you go camping, do you sleep in		
- a cabin	44.2	
- a tent	68.4	
- a trailer	22.3	
- a camper trailer	28.4	
6. When travelling on your vacation, do you camp with a		
- tent	42.3	
- trailer	14.6	
- camper trailer	24.2	
7. Where do you do most of your camping?		
- Birds' Hill Park	01.9	
- Beaches on Lake Winnipeg	48	
- Beaches on Lake Manitoba	09.6	

	<u>Yes</u>	<u>No</u>
- Whiteshell	42.6%	
- Ontario	22.3	
- _____	16.9	
Write other areas		
9. Do you camp when travelling on family vacations?	44.2	55.8
10. Have you ever been to a		
- day camp	19.7	80.3
- resident camp	39.5	60.5
11. Would you like to learn more about camping?	70.5	29.5
12. Do you ever go for hikes in the woods?	76.5	23.5
13. If yes, do you carry		
- matches	75.7	
- compass	17.4	
- maps	10.3	
- knife	61.1	
- hatchet	17.8	
14. Do you know how to use and follow a map and compass?	34.6	65.4
15. Do you		
- carry sandwiches?	43.4	
- cook your food on the trail?	35.8	
16. Does your family own camping equipment?	68	32

Part B

1. Does your family own a boat?	19.7
What kind?	
- canoe	29.2
- rowboat	23
- powerboat	55.3
- sailboat	12.3

	<u>Yes</u>	<u>No</u>
2. Have you ever rented a boat?	45.9%	54.1%
3. Do you swim?		
- not at all	06.9	
- poorly	13.3	
- reasonably well	32.2	
- well	36.7	
- very well	10.6	
4. Have you ever paddled a canoe?	66.8	33.2
If yes,		
5. Were you shown how by someone trained in canoe instruction?	31.8	
6. Did you wear a life jacket?	64	36
7. Did you use the canoe for		
- fooling around?	50.9	
- leisurely pleasure?	71.8	
- travelling and camping?	28.6	
8. Have you had swimming lessons?	77.5	22.5
9. Would you benefit from instruction in proper canoeing technique?	75	25

Part C

1. Do you hunt?	30	
- waterfowl	14.5	
- upland birds	16.4	
- rabbits	23.7	
- deer	10	
2. Have you taken a hunter safety program?	17.3	
3. Is there one or more rifles in your house?	44.6	
4. Are the rifles in your house kept locked up?	27.8	72.2

	<u>Yes</u>	<u>No</u>
5. Have you ever done any archery?	35.2%	
- indoors	38.7	
- outdoors	78.4	

Part D

1. A compass needle always points to the North Pole.	68.6	31.4
2. A canoe filled with water will sink.	38.2	61.8
3. A campfire should be large to ensure the thorough cooking of food.	07.5	92.5
4. It is impossible to put up a tent on a rocky surface.	25.8	74.2
5. Light-colored clothing does not attract mosquitoes as readily as dark-colored clothing.	33.4	66.6
6. It is colder inside a snowbank than outside of it.	06.6	93.4
7. Live trees in a forest can be cut down for firewood because		
- they burn better	15.8	84.2
- there are lots of them anyway.	08.8	91.2
8. Squirrels are true hibernators.	44.3	55.7
9. Many ducks die from "lead poisoning." This means they		
- are shot with lead	31.9	68.1
- eat the lead	52.5	47.5
10. A goose may have more than one mate each season.	35.8	64.2
11. Snowshoes are extremely difficult to walk in.	19.4	80.6

	<u>Yes</u>	<u>No</u>
12. Frostbite is best cured by rubbing with snow.	42.5	57.5
13. The "balance of nature" means that all animals eat each other.	31.9	68.1
14. Manitoba is a flat province.	39.2	60.8
15. All trees in Manitoba drop their leaves in the fall.	04.2	95.8
16. One candle in a car can keep it warm if caught in a snowstorm.	49.2	50.8

APPENDIX B

STUDENT QUESTIONNAIRE

Directions:

For each statement, indicate the extent to which you agree or disagree by marking the answer sheet.

EXAMPLE:

1. School is a great place to be.

If you strongly agree with this statement, you should mark 'A' on the answer sheet as follows:

1.	A	B	C	D	E
	()	()	()	()	()
	Strongly Agree				Strongly Disagree

There are no right or wrong answers, so respond to each item as honestly as you can.

Do not write your name on your answer sheet. Place the number you have been given on the answer sheet in place of your name.

Fill in your age and your sex.

1. Living organisms must rely on each other and on their environment.
2. My teachers are often impatient.
3. Individual citizens should be stimulated to become well-informed about resource issues, problems, management procedures, and ecological principles.
4. Land considered to be agriculturally worthless becomes valuable as it is used for recreation.
5. I try to do good work in my class.
6. The knowledge a student gains in school from all of his subjects could help him understand his environment.
7. The environment is a result of man's actions.
8. I get tired of listening to my teachers talk all the time.
9. My teachers have "pets."
10. I get discouraged easily.
11. I enjoy working on class projects with other students.
12. At school, other people really care about me.
13. I have been frequently depressed because of low marks in school.
14. I attend many school events.
15. I have been extremely afraid of something that I knew could do me no harm.
16. My teachers are friendly toward the students.
17. My teachers have encouraged me to think for myself.
18. Each morning I look forward to coming to school.
19. My teachers are personally concerned about me.
20. Progress means that we must use our resources to provide a higher material standard of living.

21. I frequently have spells of the "blues."
22. It frightens me to be alone in the dark.
23. School depresses me.
24. Cities should be limited in the size to which they can grow.
25. I sometimes envy the happiness that others seem to enjoy.
26. In school I have to memorize too many facts.
27. Wilderness areas should be set aside to prevent exploitation.
28. An organism is the product of its heredity and environment.
29. I am troubled with the idea that people are watching me on the street.
30. I often feel lonesome, even when I am with people.
31. I would like to go to school all year long.
32. Some pollutants are produced by natural processes (as well as by man).
33. Mountain climbing would be exciting for me.
34. As our standard of living increases, so does our contamination of the environment.
35. I often feel self-conscious because of my personal appearance.
36. My teachers just don't care about students if they're not going to college.
37. I do not like hard physical work.
38. In any environment, one component like space, water, air or food may be a limiting factor.
39. I stay home from school whenever I can.
40. I have a good relationship with most of my teachers.

41. My teachers are boring.
42. My teachers try to make their subjects interesting to me.
43. I am too critical of myself.
44. Each September I look forward to the beginning of school.
45. My teachers are interested in what I have to say.
46. My teachers give assignments that are too difficult.
47. Man has played a part in determining what animals and plants are around today.
48. I really feel I'm part of my school.
49. This school is run like a prison.
50. We have to plan ahead if we wish to provide natural resources for the future.
51. I do my best in school.
52. I like to talk to my teachers after class.
53. Maintaining, improving, and, in some cases, restoring soil productivity is important to the welfare of the people.
54. My school has too many rules.
55. Deep water is frightening.
56. I usually don't get involved in many school activities.
57. I liked school better when I was in elementary school than I do now.
58. I find pleasure and enjoyment in being outside.
59. Natural resources are interdependent and the use or misuse of one will affect the others.
60. I worry too long over humiliating experiences.

61. Scientists will always find an alternative source of energy, so we should utilize our present sources to their fullest extent.
62. Our school is so large, I often feel lost in the crowd.
63. I like school better than my friends do.
64. I cannot change the way I am.
65. If I had a serious problem, I don't know one teacher in my school I could go to.
66. I am troubled with feelings of inferiority.
67. My teachers like working with young people.
68. Conservation responsibilities should be shared by individuals, businesses, and industries, special interest groups, and all levels of government and education.
69. I like a bit of personal physical danger.
70. When I'm at school, I'm usually unhappy.
71. My teachers have been fair to me.
72. My teachers grade me fairly.
73. I'm very interested in what goes on at this school.
74. The area in which I live is interesting and complex.
75. I often feel rushed and nervous at school.
76. Water is a reusable and transient resource, but the available quantity may be reduced or quality impaired.
77. I think my teachers are too old-fashioned.
78. I consider myself a rather nervous person.
79. Man has to be careful with the harmful wastes he produces, if he is to survive.
80. I find it easy to make a decision.