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ABSTRACT

This annual report covering the period June, 1969 to June, 1970, is an evaluation of Project Outdoors, a Title III ESEA funded environmental education center in southeastern Connecticut. Evaluation embraces the major thrusts of the project, that is, developmental work with teachers at the Natural Science Center and local school sites via workshops, conferences, newsletters, and curriculum materials and the use of some class field trips. Three categories of teachers took part in the evaluation: project teachers, other teachers, and control teachers. Quantitative measures were assessed through a staff-prepared instrument while analysis of qualitative impact was assessed through a 15 item consultant-prepared form appearing in the appendix. Also included are a teacher interest inventory, an optional personal questionnaire, and a student interest inventory. [Not available in hardcopy due to marginal legibility of original document.] (RL)

PROJECT OUTDOORS

EVALUATION REPORT

JUNE 1970

Maureen K. Oates

TABLES

ANNUAL EVALUATION REPORT

Name of Project: Project Outdoors

Period Covered: June 1969 - June 1970

Sumitted by: Marie B. Newton, Director
Maureen K. Oates, Evaluation Consultant

I. Statement of Project Objectives and Evaluation Techniques Used.

Project Outdoors is a Title III ESEA (P.L. 89-10) environmental education center working with ten towns is Southeastern Connecticut. The objectives of the project as stated in the proposal are as follows:

1. To emphasize the importance of environmental education in the school curriculum.

2. To provide teachers and their pupils with outdoor learning experiences to increase their awareness and understanding of the environment.

3. To show teachers the various ways the out-of-doors can be used in teaching.

4. To show teachers how to use the resources existing on their school sites and in their communities.

The main thrust of the project has been developmental work with teachers at the Natural Science Center and at local school sites, with some class field trips provided.

Techniques used in evaluation of the objectives fall into two categories: quantitative measures prepared by the staff, and more formal evaluation prepared by a consultant.

Quantitative measures include the following:

Workshops at the Natural Science Center	15
Workshops at Schools	23
Teacher Conferences	250
Class Visits and Field Trips	329
Number of Workshop Participants	503
Number of Classes Participating	92
Number of Outside Visitors to Center	150
Newsletters disseminated	4
Curriculum Materials Prepared	50

These measures present evidence that exposure of teachers and their pupils to outdoor learning experiences, as proposed in objectives 2, 3, and 4, is being provided in a variety of ways.

Analysis of qualitative impact is based on the following:

Teacher Impact:

1. Cognitive
   Content achievement in natural sciences and methodology in outdoor science teaching assessed through a 15 item multiple choice test, which was administered to 78 teachers in the 1970 Spring workshop and to 26 control teachers not participating in the project.

2. Affective
   Attitude towards nature and the outdoor learning experience assessed through a semantic differential, a ten item response form -- on three different topics -- administered to the same groups of teachers.

3. Affective
   Teacher interest in further knowledge and assistance assessed through a 30 response form administered to the same groups of teachers.

Copies of these instruments appear in the appendix at the end of this report. The Crosstabs II program was utilized to process responses. This is a generalized multivariate frequency distribution program which operates on the IBM system/360. The higher the contingency coefficient, the stronger is the evidence for interdependence of the variables.

Student Impact:

1. Interest in out-of-doors and natural science assessed through a single measure, a topical selection for writing of a paragraph.

II. Description of Evaluation Population

A. Identify those who took part in evaluation.
Teachers who took part in the evaluation fall into three categories: project teachers, other teachers and control teachers.

Project teachers are chosen on a percentage basis decided by the size of each participating town. They are entitled to participate in special all day workshops held at the Natural Science Center for which the project assumes the cost of their substitutes. In addition, their classes receive a field trip paid for by the project. Staff members visit these classes three times during the year and work with their teachers as requested.

Other teachers are all teachers of a particular school who have participated in workshops held for them in each town.

Control teachers have not taken part in either of the above activities.

Project teachers who took part in the evaluation were all participants in the Spring 1970 workshop. Constraints of time and staff did not allow for random selection from the total group.

B. Indicate number, characteristics, and other related information about those included.

A total of 78 project teachers and 26 control teachers responded to the evaluation prepared by our consultant. Students responded to interest in out-of-doors and natural science by means of a topical selection for writing a paragraph. Of these 329 were students of project teachers and 338 of control teachers.

Staff-prepared instruments were administered to 92 project teachers at both the fall and winter workshops. These instruments were also given to 411 teachers who participated in workshops held at individual schools. (Table 1.)

III. Evaluation Process and Sequence

Discussions of elementary science curriculum and evaluation in recent literature are relevant to the evaluation design proposed for Project Outdoors. Blackwood and Porter remark that testing may defeat affective goals. If the goal is to build interest in the environment but testing attempts to measure academic achievement, there is disjunction between what the child is expected to know and what he was supposed to be learning. Atkin discusses the tendency to assume that those attributes which we can measure are the elements which we consider most important, and points out that worthwhile goals come first, even though a single course may provide only a small increment toward long term effects. Broudy explores the interpretive use of knowledge rather than the traditional applicative use of knowledge as an essential development in science education for the average citizen. Tyler, in his analysis of current research in science education, stresses need for assessment pertinent to what the teacher is trying to do. These factors were discussed with Project Outdoors staff in the initial stage of developing the evaluative instruments for the project. Bloom and Krathwohl's Taxonomies of Educational Objectives were also given consideration. As a result of the discussion, use of the Semantic Differential is a pilot effort in the evaluation of environmental education programs. Other measures concerned with attitudinal response and value formation were also considered, but could not be utilized because of constraints of time and funding.

The staff-prepared instruments were given in the fall and winter at the close of each of the 23 workshops held at individual schools, and to all those attending the 13 workshops held at the Natural Science Center.

The consultant-prepared evaluation forms were given to 78 project teachers at the spring workshops. The test forms for 26 control teachers were administered by their principals at their respective schools.

Several factors limit the validity of this assessment. Stated goals imply value formation as well as cognitive achievement, with the lack of validated evaluative instruments for either cognitive or affective areas of environmental education a problem. The sample is small, and not randomly

Fall & Winter Workshop Evaluations

Responses to the Question, "How well did the staff succeed in carrying out the purpose of this workshop?"

	Fall		Winter	
Response	Frequency	Percent	Frequency	Percent
Outstanding	81	20	21	25
Very Good	273	68	53	64
Adequate	49	12	9	11
Poor	0	0	0	0
Total	403	100	83	100

Responses to the Question, "Were the Activities presented of benefit to your teaching?"

	Fall		Winter	
Response	Frequency	Percent	Frequency	Percent
Outstanding	53	14	18	22
Very Good	245	66	49	59
Adequate	67	18	15	18
Poor	5	2	1	1
Total	370	100	83	100

Responses to the Question, "How did this in-service workshop compare with other in-service programs you have taken?"

	Fall		Winter	
Response	Frequency	Percent	Frequency	Percent
Outstanding	85	27	27	36
Very Good	194	62	43	57
Adequate	32	10	5	7
Poor	3	1	0	0
Total	314	100	75	100

Table 1

selected, due to lack of time and personnel needed to conduct a more controlled investigation. Especially for assessment of attitude, larger samples more carefully selected would be desirable. Nevertheless, the results of this study provide a positive indication of the potential of Project Outdoors for meeting its objectives.

IV. Presentation of Results

Since workshops have been such an important part of our program, they appear under each of our four objectives as an indication of how we are carrying them out. Data obtained from the responses to staff-prepared instruments for fall and winter workshop evaluations are presented on Table 1. Project Outdoors was consistently rated "Very Good" by a majority of participants on the three questions asked.

Objectives 1 and 3 included the use of kits. There were 84 kits covering 6 different subjects. It was impossible to compile complete data on the use of these kits. Distribution centers informed us that kits signed out by one teacher would be used by many teachers in her building before they were returned. However, the following is a partial indication of their use. These are partial figures for four towns having access to 54 kits.

Subject	No. of Teachers Using Them
Birds	51
Earth Science	74
Forest Community	63
Insects & Allies	50
Plants	76
Pond	54

Table 2.

Content achievement relative to objectives 1 and 2 was assessed through use of a 15 item multiple choice instrument (See appendix). Scores ranged from 8 to 15 for both Project and Control teachers, with a mean score of 12.1 for Project teachers and 11.3 for Control teachers. An item analysis for each question provides further information.

Achievement Test Item Analysis

Total Number of Correct Responses/Item

	Project Teachers N = 78 M = 12.1	Control Teachers N = 26 (x3) M = 11.3
1.	64	57
2.	71	75
3.	72	78
4.	77	78
5.	73	75
6.	68	63
7.	52	42
8.	50	45
9.	65	72
10.	52	39
11.	47	48
12.	76	75
13.	49	39
14.	55	36
15.	77	60

Table 3.

Elimination of test items for which both groups had over 70 responding correctly out of a possible 78 leaves one item, #9, on which Project teachers responded incorrectly much more often than the Control group. This item is concerned with the source of oxygen supply in the air, and apparently needs more emphasis in workshop discussion. The item on which Project teachers scored lowest was #11, which also had poor response from Control teachers. This item is concerned with the watershed concept. On the other hand, Project teachers scored correctly significantly more often on six of the fifteen test items: #1, 7, 10, 13, 14, and 15. These are concerned with the importance of wilderness areas to man, the food chain, the water cycle, over-population, predation, and the woodlands. This illustrates the effectiveness of Project Outdoors workshops' emphasis on teacher awareness and understanding of the environment, a necessary basis for environmental education in the school curriculum.

The impact of Project Outdoors workshops on teachers is further assessed through sections D, E, and H on the Teacher Interest Inventory (See appendix). Tables 4 and 5 are a presentation of response to question D, "Have you had sufficient background in natural science to enable you to make effective use of the outdoors with your classes?", cross-tabulated with background in natural science. (See Table 4 for Project and Table 5 for Control). Examination of the tables for the Project and for the Control group shows that the majority of teachers continue to lack confidence, whatever their background.

NAT SCI TAKEN
BY BACKGROUND EFFECTIVE

HOAS BACKGROUND EFFECTIVE COLUMNS NAT SCI TAKEN

		COLLEGE	GRADUAT	PROJECT OUTDOOR	OTHER IN-SERV	OTHER AGENCY	SUM	KEY
YES		27	5	28	3	2	65	RAW
		27	5	28	3	2	65	WTD
		1	1	1	1	1	1	MEM
		1	1	1	1	1		SDV
NO		42	8	50	7	5	112	RAW
		42	8	50	7	5	112	WTD
		1	1	1	1	1	1	MEM
		1	1	1	1	1		SDV
SUMS		69	13	78	10	7	177	RAW
		69	13	78	10	7	177	WTD
		1	1	1	1	1	1	MEM
								SDV

CHI-SQUARE .606562 DEGREES FREEDOM 4
PHI .585398 E -01
CONT. COEF. .584397 E -01

*****TABLE TOTALS... RAW 177 WTD 177

TABLE 4.

NAT SCI TAKEN
BY BACKGROUND EFFECTIVE

ROWS=BACKGROUND EFFECTIVE COLUMNS= NAT SCI TAKEN

		COLLEGE	GRADUAT	PROJECT OUTDOOR	OTHER IN-SERV	OTHER AGENCY	SUM	KEY
YES		7	1		1		9	RAW
		7	1		1		9	WTD
		1	1		1		1	MEN
								SDV
NO		16	3		3	3	25	RAW
		16	3		3	3	25	WTD
		1	1		1	1	1	MEN
								SDV
SUMS		23	4		4	3	34	RAW
		23	4		4	3	34	WTD
		1	1		1	1	1	MEN
								SDV

7/26 2/8

16/26 5/8

CHI-SQUARE = .127459 E 01 DEGREES FREEDOM = 3
PHI = .193518
CONT. COEF. = .190088

*****TABLE TOTALS... RAW= 34 WTD= 34

TABLE 6.

8

PROJECT OUTDOORS
EXPERIMENTAL

TABLE

NAT SCI TAKEN
BY TYPE USE WITH CLASS

ROWS TYPE USE WITH CLASS COLUMNS NAT SCI TAKEN

	COLLEGE	GRADUAT	PROJECT OUTDOOR	OTHER IN-SERV	OTHER AGENCY	SUM	KEY
CURRENT EVENTS	63	12	70	10	7	162	RAW
	63	12	70	10	7	162	WTD
	1	1	1	1	1	1	MEN
							SDV
BULLETIN BOARD	54	11	60	9	6	140	RAW
	54	11	60	9	6	140	WTD
	1	1	1	1	1	1	MEN
							SDV
ART LESSON	39	8	44	7	6	104	RAW
	39	8	44	7	6	104	WTD
	1	1	1	1	1	1	MEN
							SDV
FIELD TRIP	41	8	45	6	2	102	RAW
	41	8	45	6	2	102	WTD
	1	1	1	1	1	1	MEN
							SDV
SUMS	197	39	219	32	21	508	RAW
	197	39	219	32	21	508	WTD
	1	1	1	1	1	1	MEN
							SDV

70/78

60/78

44/78

45/78

9

CHI-SQUARE .283797 E 01 DEGREES FREEDOM 12
PHI .647720 E -01
CONT. COEF. .640403 E -01

X

*****TABLE TOTALS... RAW 508 WTD 508

TABLE 6.

NAT SCI TAKEN
BY TYPE USE WITH CLASS

ROWS=TYPE USE WITH CLASS COLUMNS= NAT SCI TAKEN

	COLLEGE	GRADUAT	PROJECT OUTDOOR	OTHER IN-SERV	OTHER AGENCY	SUM	KEY
CURRENT EVENTS	17	4		3	2	26	RAW
	17	4		3	2	26	WTD
	1	1		1	1	1	MEN
							SDV
BULLETIN BOARD	17	3		2	2	24	RAW
	17	3		2	2	24	WTD
	1	1		1	1	1	MEN
							SDV
NAT LESSON	11	2		1	1	15	RAW
	11	2		1	1	15	WTD
	1	1		1	1	1	MEN
							SDV
FIELD TRIP	6	2		3	1	12	RAW
	6	2		3	1	12	WTD
	1	1		1	1	1	MEN
							SDV
SUMS	51	11		9	6	77	RAW
	51	11		9	6	77	WTD
	1	1		1	1	1	MEN
							SDV

CHI-SQUARE = .321654 E 01 DEGREES FREEDOM = 9
PHI = .204585
CONT. COEFF. = .200245

*****TABLE TOTALS... RAW= 77 WTD= 77

TABLE 7.

Section E on the Teacher Inventory deals with use of environmental topics with the class. Tables 6 and 7 illustrate the impact of Project Outdoors in this area, with the relatively high value of the Contingency Coefficient on the experimental table confirming the significance. (See Table 6 for Project and Table 7 for Control.)

The question of frequency of the outdoor learning experience for the class is covered in Section H. Raw scores in this tabulation are as follows:

Frequency of Outdoor Experience

Number of Trips Reported by Teachers

	Project Outdoors N = 78	Control Teachers N = 26
Once/week	2	-
Once/month	23	3
Once/year	39	12
Only by Pre-arrangement	10	7
Never	2	4

Table 8

Control group raw scores may be tripled to equate them with Project scores. It is noteworthy that only in the "Pre-arranged" and "Never" categories do the control scores then surpass the Project scores.

Attitudinal assessment is based on a semantic differential developed for this evaluation (See appendix). The nature of more enlightened value statements must be considered in interpretation of response. The extent of one's experience with ponds and trees and foxes affects one's perceptions both positively and negatively. We are interested in observing whether there are significant differences in the overall attitudes of the Project and the Control teachers, not on what the specific attitudinal scores are. The Contingency Coefficients listed in Table 9 are based on cross-tabulation of attitudinal response on the selected environmental topics with certain background measures. These include several associated with innovation adoption in the research literature. (See Campbell, Insko, Rogers.)

Cross-tabulation of Attitudinal Response with Background Measures

	Project Teachers N = 78	Control Teachers N = 26
	Contingency	Coefficient
Pond with Nat. Sci. Background	.2797	.3628
Fox with Nat.Sci. Background	.2275	.3742
Tree with Nat.Sci. Background	.2736	.4323
Pond with No. of Magazines subscribed to	.3482	.6866
Fox with No. of Magazines	.3808	.5109
Tree with No. of Magazines	.2616	.5309
Pond with No. of Organizations membership in	.1905	.3309
Fox with No. of Organizations	.2785	.3713
Tree with No. of Organizations	.2838	.2931

Table 9

Items from 38 cross-tabulations of the background variables with the attitudinal response items show higher contingency coefficients for the control group, with 5 cross-tabulations showing lower contingency coefficients for the control group. Data on all of the cross tabulations are on file.

These scores show stronger evidence for interdependence of variables in the control group. The inference can be made that Project Outdoors experience has provided an added dimension for attitude formation that alters the relationship of the variables. This is on the receiving level of attitudinal impact. (Krathwohl) The semantic differential does not make a more specific conclusion possible. It should be noted that an Interest Inventory on the responding level and a Preference Selection on the value formation level were discussed for both teacher and student assessment, but could not be included in this study because of constraints of time and funding.

Teacher interest in further knowledge is covered by sections B, C, F, and G on the Teacher Interest Inventory (See appendix). In response to B, 29 Project Outdoors teachers and 10 Control teachers plan to take another natural science course.

FUTURE PREFERENCE

ROWS CONTENT CHOICE COLUMNS STUDY PREFERENCE

		GRADUAT	PROJECT OUTDOOR	OTHER IN-SERV	OTHER AGENCY	NOT ANY	SUM	KEY
CONCEPTI		19	26	19	13	1	78	RAW
		19	26	19	13	1	78	WTD
		1	1	1	1	1	1	MEN
								SDV
SKILL		16	22	17	7	2	64	RAW
		16	22	17	7	2	64	WTD
		1	1	1	1	1	1	MEN
								SDV
TCHG METHOD		23	36	26	8	3	96	RAW
		23	36	26	8	3	96	WTD
		1	1	1	1	1	1	MEN
								SDV
MATERIAL		20	32	23	13	1	89	RAW
		20	32	23	13	1	89	WTD
		1	1	1	1	1	1	MEN
								SDV
UNDERSTI		23	33	27	12	1	96	RAW
		23	33	27	12	1	96	WTD
		1	1	1	1	1	1	MEN
								SDV
SUMS		101	149	112	53	8	423	RAW
		101	149	112	53	8	423	WTD
		1	1	1	1	1	1	MEN
								SDV

CHI-SQUARE .557487 E 01 DEGREES FREEDOM 16
PHI .114801
CONT. COEF. .114052

*****TABLE TOTALS... RAW 423 WTD 423

TABLE 10.

FUTURE PREFERENCE

ROWS= CONTENT CHOICE COLUMNS= STUDY PREFERENCE

	GRADUAT	PROJECT OUTDOOR	OTHER IN-SERV	OTHER AGENCY	NOT ANY	SUM	KEY
CONCEPT	5	5	3	1	2	16	RAW
	5	5	3	1	2	16	WTD
	1	1	1	1	1	1	MEN
							SDV
SKILL	2	5	5	3		15	RAW
	2	5	5	3		15	WTD
	1	1	1	1		1	MEN
							SDV
TCHG METHOD	5	9	5	4		23	RAW
	5	9	5	4		23	WTD
	1	1	1	1		1	MEN
							SDV
MATERIAL	3	5	5	4		17	RAW
	3	5	5	4		17	WTD
	1	1	1	1		1	MEN
							SDV
UNDERST	7	8	8	6	2	31	RAW
	7	8	8	6	2	31	WTD
	1	1	1	1	1	1	MEN
							SDV
SUMS	22	32	26	18	4	102	RAW
	22	32	26	18	4	102	WTD
	1	1	1	1	1	1	MEN
							SDV

CHI-SQUARE = .102432 E 02 DEGREES FREEDOM = 16
PHI = .316497
CONT. COEF. = .302091

*****TABLE TOTALS... RAW= 102 WTD= 102

TABLE 11.

FUTURE PREFERENCE

ROWS ASSISTANCE CHOICE COLUMNS STUDY PREFERENCE

	GRADUAT	PROJECT OUTDOOR	OTHER IN-SERV	OTHER AGENCY	NOT ANY	SUM	KEY
LESSONS	14	20	16	6	1	57	RAW
	14	20	16	6	1	57	WTD
	1	1	1	1	1	1	MEN
							SDV
SITE DEVELOP	22	34	28	12	2	98	RAW
	22	34	28	12	2	98	WTD
	1	1	1	1	1	1	MEN
							SDV
LIBRARY	6	5	4	2	1	17	RAW
	6	5	4	2	1	17	WTD
	1	1	1	1	1	1	MEN
							SDV
CONSULT	27	41	29	16	3	116	RAW
	27	41	29	16	3	116	WTD
	1	1	1	1	1	1	MEN
							SDV
MATERIAL	27	43	29	15	2	116	RAW
	27	43	29	15	2	116	WTD
	1	1	1	1	1	1	MEN
							SDV
SUMS	96	143	106	51	8	404	RAW
	96	143	106	51	8	404	WTD
	1	1	1	1	1	1	MEN
							SDV

CHI-SQUARE .275998 E 01 DEGREES FREEDOM 16
PHI .826537 E -01
CONT. COEF. .823728 E -01

*****TABLE TOTALS... RAW 404 WTD 404

TABLE 12.

PROJECT OUTDOORS
CONTROL

TABLE 51

PAGE 1 - 1

FUTURE PREFERENCE

ROWS= ASSISTANCE CHOICE COLUMNS= STUDY PREFERENCE

	GRADUAT	PROJECT OUTDOOR	OTHER IN-SERV	OTHER AGENCY	NOT ANY	SUM	KEY
LESSON	3	3	2	1	1	9	RAW
	3	3	2	1	1	9	WTD
	1	1	1	1	1	1	MEN
	1	1	1	1	1		SDV
SITE	5	7	6	4	1	23	RAW
DEVELOP	5	7	6	4	1	23	WTD
	1	1	1	1	1	1	MEN
	1	1	1	1	1		SDV
LIBRARY	1	1	1	1	1	1	RAW
	1	1	1	1	1	1	WTD
	1	1	1	1	1	1	MEN
	1	1	1	1	1		SDV
CONSUL	5	7	7	5	1	25	RAW
	5	7	7	5	1	25	WTD
	1	1	1	1	1	1	MEN
	1	1	1	1	1		SDV
MATERIA	10	15	11	8	2	46	RAW
	10	15	11	8	2	46	WTD
	1	1	1	1	1	1	MEN
	1	1	1	1	1		SDV
SUMS	23	32	27	18	4	104	RAW
	23	32	27	18	4	104	WTD
	1	1	1	1	1	1	MEN
							SDV

CHI-SQUARE = .441240 E 01 DEGREES FREEDOM = 16
PHI = .205978
CONT. COEF. = .201743

*****TABLE TOTALS... RAW= 104 WTD= 104

TABLE 13.

Tables 10 and 11 are cross-tabulations of content choice (F) for a natural science workshop with study preference (C). This illustrates a preference for Project Outdoors workshops among both Project and Control teachers, with greatest interest indicated in teaching methodology and in understanding of environmental subjects.

Tables 12 and 13 are cross-tabulations of assistance choice (G) in utilization of an outdoor area on a school site with study preference (C). For this kind of assistance Project Outdoors is again the choice of the greatest number in both groups, with need for material and equipment the primary concern of both groups.

Assessment of student impact is based on a single measure, designed to probe student interest in environmental topics. The list of topics was presented to the classes for their free selection in writing a paragraph. No mention of Project Outdoors was made. The results are as follows:

Topical Selection as Measure of Student Impact

Topic	Project Students N = 329	Control Students N = 338
TV	49	64
Bikes	61	63
Litter	95	57
Parades	28	28
Woodlands	48	65
Ponds	58	61

Table 14

There is more than a chance selection of the topic "Litter", indicating some impact from Project Outdoors in this area.

Again, additional measures of student impact were discussed and set aside for the same reasons. Instruments considered include a modified Learning Environment Inventroy (Walberg) and a modified Science Process Inventory (Welch), both adapted for upper elementary school. Attitudinal assessments would also be appropriate with students.

V. Analysis and Conclusions

For the analysis of the data, see Section IV.

In summary, there has been appreciable progress towards Project Outdoors' goals. Project teachers achieved significantly higher cognitive scores on 6 out of 15 test items, and a lower score on only 1 item. Project teachers

do not express any greater confidence in their background for use of the outdoors (Tables 4 and 5), but they do utilize environmental topics with their classes to a significantly greater extent (Tables 6 and 7). They also take their classes out-of-doors for a learning experience more frequently (Table 8).

The Semantic Differential demonstrated that on the receiving level of attitudinal impact, Project Outdoors did provide an effective variable. This indicates a possible avenue for further study of affective learnings, an area greatly in need of applied research.

Teachers interested in further knowledge express more preference for Project Outdoors for content workshops and for site assistance. They identify teaching methodology and understanding of concepts as primary content concerns, and the need for materials and equipment as a first choice for site assistance.

A single measure of student impact demonstrated that at least on the topic of litter, children in Project classrooms are more concerned.

The programs developed by the Project have indeed been successful with the teachers and students they have reached. A good thing has been started in the center, with potential for greater impact in the area of environmental education if the needed support for growth is provided.

BIBLIOGRAPHY

Atkin, J. Myron. "Behavioral Objectives in Curriculum Design: A Cautionery Note", The Science Teacher, Vol.35, No.5, May 1968.

Blackwood, Paul E., and T. R. Porter. "How to Evaluate Science Learning in the Elementary School", NSTA Instructional Aid Bulletin #471.

Bloom, Benjamin. A Taxonomy of Education Objectives: Cognitive Domain, N. Y.: David McKay Co., 1956.

Broudy, Harry S. "Science and Human Values", The Science Teacher, Vol.36, No.3, March 1969.

Campbell, H. L. "Factors Related to Differential Use of Information Sources", M.S. Thesis, Iowa State University, Ames, 1959.

Insko, C. A. Theories of Attitude Change. New York: Appleton, Century Croft, 1967.

Krathwohl, David R. Taxonomy of Educational Objectives: Affective Domain, New York: David McKay Co., 1964.

Rogers, E. M. Diffusion of Innovations. New York: The Free Press of Glencoe, 1962.

Tyler, Ralph W. "Analysis of Strengths and Weaknesses in Current Research in Science Education", JRST, Vol.5, Issue 1, 1968.

Walberg, Herbert J. Learning Environment Inventory, Harvard Project Physics, Cambridge, Massachusetts, 1967.

Welch, Wayne. Science Process Inventory, Madison: University of Wisconsin, 1966.

APPENDIX

PROJECT OUTDOORS

Achievement Test

Please answer each one of the following statements by circling the proper letter. <u>If you feel that more than one answer may be correct, choose the best answer</u>. Please answer all the questions.

1. Wilderness areas are important to man

    a) to provide recreation areas.
    b) to provide natural resources for man's use.
    c) to provide habitats for many living things.
    d) all of the above.

2. The plant population of a forest

    a) is not affected by animal activity.
    b) is determined mainly by animal activity.
    c) may change over a period of time because of animal activity.
    d) does not change.

3. The floor of a forest consists of

    a) useless old plant material.
    b) decaying leaves.
    c) last year's fallen leaves and branches.
    d) a thriving community of small plant and animal life.

4. Scientists believe that events in the natural world are

    a) always interrelated.
    b) under man's control.
    c) less important than technology.
    d) of minor concern for human existence.

5. Minerals are freed from dead plant material through the process of

    a) chlorophyll.
    b) succession.
    c) decay.
    d) photosynthesis.

6. In order to manufacture their own food, plants must have

    a) wind and rain.
    b) sunshine and chlorophyll.
    c) carbon dioxide and water.
    d) both b and c.

7. Which of the following is the best example of a food chain?

    a) sunlight, duckweed, duck.
    b) sunlight, wheat, flour, bread.
    c) grass, mouse, fox, bacteria.
    d) cactus, moose, hawk.

8. Plants provide man with

a) all his food ultimately.
b) all his oxygen practically.
c) neither.
d) both

9. The oxygen supply in the air is maintained by

a) reaction from electrical storms.
b) action of the wind.
c) green plants.
d) ncne of the above.

10. The water cycle is greatly influenced by

a) replacing forest and fields with buildings and pavement.
b) man's attempts to seed clouds for rain.
c) after-effects of atomic explosions.
d) none of the above.

11. A watershed is

a) a building by a stream where there is a water wheel for power.
b) a land area drained by a river system.
c) a well with a roof over it.
d) forest surrounding a reservoir.

12. When man changes the environment to meet his own needs

a) the effects on other living things are not important in terms of man's survival.
b) animal life can simply move on to another similar area.
c) he is affecting a vast system of interrelationships of which he is a part.
d) it will inherently be for the benefit of future generations.

13. The most serious threat to man's existence on earth is

a) over-population.
b) air pollution.
c) lack of nutritious food.
d) water pollution.

14. Predation on wild rabbits is needed because

a) it increases the number of predators.
b) it limits the size of the rabbit population.
c) it allows predators such as foxes and hawks to survive.
d) none of the above, - predation is not needed.

15. Which of the following statements is true?

a) any plant can grow in any soil.
b) trees do not affect the temperature of the forest.
c) a great deal of moisture in the air comes from trees.
d) the only way to identify a tree is by its leaves.

PROJECT OUTDOORS

Semantic differential on attitudes towards natural environment.

For each topic listed, there is a set of antonyms with five possible degrees of reaction. This is not a test of knowledge, but a check on opinion regarding these topics. It is important to answer rapidly by checking the space that best describes how you feel.

Topic	Degree:					
	Very	Somewhat	Neither	Somewhat	Very	
Fox						
Harmful	____	____	____	____	____	Helpful
Interesting	____	____	____	____	____	Dull
Dangerous	____	____	____	____	____	Safe
Pretty	____	____	____	____	____	Ugly
Enjoyable	____	____	____	____	____	Irritating
Clean	____	____	____	____	____	Dirty
Worthless	____	____	____	____	____	Valuable
Survival	____	____	____	____	____	Death
Important	____	____	____	____	____	Trivial
Messy	____	____	____	____	____	Neat

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Topic	Degree:					
	Very	Somewhat	Neither	Somewhat	Very	
Pond						
Harmful	____	____	____	____	____	Helpful
Interesting	____	____	____	____	____	Dull
Dangerous	____	____	____	____	____	Safe
Pretty	____	____	____	____	____	Ugly
Enjoyable	____	____	____	____	____	Irritating
Clean	____	____	____	____	____	Dirty
Worthless	____	____	____	____	____	Valuable
Survival	____	____	____	____	____	Death
Important	____	____	____	____	____	Trivial
Messy	____	____	____	____	____	Neat

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Topic	Degree: Very	Somewhat	Neither	Somewhat	Very	
Tree						
Harmful	____	____	____	____	____	Helpful
Interesting	____	____	____	____	____	Dull
Dangerous	____	____	____	____	____	Safe
Pretty	____	____	____	____	____	Ugly
Enjoyable	____	____	____	____	____	Irritating
Clean	____	____	____	____	____	Dirty
Worthless	____	____	____	____	____	Valuable
Survival	____	____	____	____	____	Death
Important	____	____	____	____	____	Trivial
Messy	____	____	____	____	____	Neat

PROJECT OUTDOORS

Teacher Interest Inventory

Each of the following questions can be answered by checking either the "Yes" or "No" column on the right hand side of the page. Your candid responses will be helpful in planning future workshops.

		Yes	No
A.	Have you studied natural science concepts		
	1. in college courses (undergraduate).....	____	____
	2. in graduate courses while teaching.....	____	____
	3. in Project Outdoors workshops.....	____	____
	4. in other in-service workshops.....	____	____
	5. through other agencies.....	____	____
B.	6. Do you intend to take another natural science course?.....	____	____
C.	If you had it to do all over again, would you study natural science for classroom teacher use		
	7. in graduate courses.....	____	____
	8. in Project Outdoors workshops.....	____	____
	9. in other in-service workshops.....	____	____
	10. through other agencies.....	____	____
	11. not at all.....	____	____
D.	12. Have you had a sufficient background in natural science to enable you to make effective use of the outdoors with your classes?.....	____	____
E.	Have you used environmental topics with your class		
	13. for current events in social studies.....	____	____
	14. for bulletin board displays.....	____	____
	15. for art lessons.....	____	____
	16. for ecology field trips.....	____	____

	Yes	No
F. Check two of these subjects that you would prefer to have emphasized at a natural science workshop		
18. Concepts	____	____
19. Skills(use of microscope, etc)	____	____
20. Teaching methods	____	____
21. Resource materials	____	____
22. Your personal understanding of environmental subjects	____	____
G. What type of assistance would be most valuable to you in utilizing an outdoor area at your school? (check two)		
23. Planning the lessons	____	____
24. School site study/development	____	____
25. Library resources	____	____
26. Specialists and consultants	____	____
27. Materials and equipment	____	____
H. How often do you take your class outdoors for a learning activity in any subject area? (Not only science) (Check one)		
28. Once per week or oftener(weather permitting)	____	____
29. Once per week to once per month	____	____
30. Once or twice in the course of the school year	____	____
31. Only for pre-arranged field trips	____	____
32. Never	____	____

PROJECT OUTDOORS

Optional Personal Questionnaire

Would you tell us a little about yourself?

33. Number of magazines you subscribe to:

0 - 2 ____
3 - 5 ____
6 - 9 ____
10 + ____

34. Do you drive a

station wagon ____
sedan ____
sports car ____
convertible ____

35. Number of best sellers read during the past year:

0 - ____
1 - 2 ____
3 - 5 ____
6 + ____

36. Number of associations/organizations/clubs you belong to:

0 - 2 ____
3 - 5 ____
6 - 9 ____
10 + ____

Have you ever supported a cause by

		Yes	No
37.	writing your congressman?	____	____
38.	campaigning?	____	____
39.	demonstration?	____	____
40.	financial contribution	____	____

PROJECT OUTDOORS

Student interest inventory:

In order to assess the classroom outcome of Project Outdoors, we would like the students to write a paragraph on the topic of their own choice selected from the following list:

a. Bicycles

b. Litter

c. Parades

d. Ponds

e. A Television Program

f. Woodlands

The measure that we want is how many students select each topic. Do not tell them that it is for Project Outdoors, or that it has anything to do with their science lessons. The selection should reflect their own personal interests, for a writing exercise.

Thank you for your cooperation.

PRUDENCE CRANDALL SCHOOL
Thompsonville, Connecticut 06082

Dennis W. Balsewicz
Principal

May 9, 1970

Dear Mrs. Newton,

I wish to thank you and your staff for the exciting and very informative day spent with you on May 8. As a teacher interested in Ecological and Conservation Education, I found it most helpful to talk with you, learning of resource materials and discussing goals and philosophy of outdoor education. My observations in the field, both in the morning and afternoon were most helpful. I'm fearfully jealous as I wish I taught in your area and could take advantage of your resources.

I hope your project continues to prosper. In times like ours, when outdoor education is crucial in order to develop an appreciation for and understanding of the environment, Project Outdoors is especially valuable.

Many thanks,

Connie Norris

PRUDENCE CRANDALL SCHOOL
Thompsonville, Connecticut 06082

Dennis W. Balsewicz
Principal

May 20, 1970

Mrs. Marie B. Newton
Project Outdoors
Natural Science Center
269 Oak Grove Street
Manchester, Connecticut 06040

Dear Mrs. Newton,

Thank you for my informative and enjoyable day at Project Outdoors. I am so glad I made time to go, and wish I had done it over a year ago when I first heard of it.

What a wonderful job you and your associates are doing. It would seem to me that for a child to make even one trip to such a center, would so influence his feelings, and sharpen his method of observation, that he could never again become thoughtless or destructive.

I especially noticed the matter-of-fact, low key method of instruction - - - the "more is caught than is taught" philosophy.

Your advice concerning charts, books and materials will be useful to me and my future classes.

I shall pass on the word of what you are doing, and hope that others will go and see the fine things going on there, and hopefully work toward more of this kind of experience for all school children.

Please give my thanks to Miss Maynard and Mrs. Sutliffe, and again many thanks to you.

Sincerely yours,

Edis Houghton
(Mrs. James T.)