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Michigan State University PH.D. 1982

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ATTITUDES, ACTIONS AND COMMUNICATION BEHAVIORS OF TEACHERS BEFORE AND AFTER EXPERIENCING AN ENVIRONMENTAL EDUCATION WORKSHOP

by

Douglas C. Covert

A DISSERTATION

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ABSTRACT

ATTITUDES, ACTIONS AND COMMUNICATION BEHAVIORS
OF TEACHERS BEFORE AND AFTER EXPERIENCING
AN ENVIRONMENTAL EDUCATION WORKSHOP

By

Douglas C. Covert

This study was designed to identify and measure changes in attitudes and behaviors of teachers who had experienced a well-established workshop for training teachers in environmental education. Data from this before-and-after study offer a basis for examining and evaluating programs directed at teachers and prospective teachers.

Entry measurements were made of 123 teachers entering Michigan's "Teachers' Environmental School" in 1978 and of 77 teachers attending in 1979. Second measurements were made by mail survey in November 1979 with response rates of 46 and 53 percent respectively. Tests of internal validity, reliability, normality of response distribution, and equality of variance were satisfactory.

No changes were found in environmental attitudes using Likert-scale responses to specific statements. Lack of difference was also found in similar groups measured in 1965. Factor analysis identified two principal factors,

environmental conservation and socio-political, neither showing significant change. Measurements of personal actions favorable to the environment showed some shifts in details of activity, but no significant differences overall between the before and after responses.

About three-fourths of the teachers conducted some form of environmental education in their school program, averaging nine to twelve minutes per day. While a lower percentage involved students in out-of-school environmental learning activities in the second measurement, they did so more often, both changes significant at .05. In-school quantities did not change significantly.

Mass media use averaged 3.9 hours per day with time divided almost equally between television, radio and the periodical-print media. Preference was shown for those presentations treating topics in depth. No sources were reported as preferred for resolving conflicts in environmentally related information received. Colleagues were perceived as being no more reliable or credible than media news sources.

Overall results showed no significant differences between before and after responses except for out-of-school environmental learning activities. Extension of results should not be made to programs of the Teachers' Environmental School, or elsewhere, which depart substantially from those of the years included in this study.

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CHAPTER I

INTRODUCTION AND LITERATURE REVIEW

Introduction

Concern for the earth's biological and physical resources has prompted many educational programs focusing on the human environment. Directed at both young people and adults, success has been claimed for most of these programs based on enrollment demands and the enthusiasm of participants.

But an educational process of such fundamental character as environmental education should be evaluated for its effects, not its popularity. Intuitive evaluations need to be subjected to analytical scrutiny; rational examination may support or reject some or all of the programs, and some or all of the processes.

A well-established program is Michigan's "Teachers' Environmental School," intensive, week-long, residential workshops conducted during the summer by Michigan universities. Here teachers expect to learn concepts and details useful in their professional practice of environmental education. Through several decades, it has earned a reputation for excellence and serves well as a model for

evaluation of effects.

This investigation was developed to identify changes in attitudes and behaviors of teachers who had experienced the Teachers' Environmental School. It was expected that some of the findings in this before-and-after study would link changes in attitudes or behaviors to the environmental education experience.

Little has been reported to date about the effects on attitudes, perceptions of environmental education content, or professional behaviors of teachers who have undergone extended environmental education training. Much of the work in this area has used students, particularly college students as the subjects of investigation. Teachers expressing interest in "environmentalizing" their teaching or volunteering for training in environmental education have not been thoroughly described nor change-effects widely reported.

There are administrative and legal mandates supporting environmental education. In the state of Michigan, the Department of Education has said:

> . . . education has an important role to play now and in the coming years in helping people rationally solve some of the persistent problems associated with our natural and man-made environment. Education is the key to changing human attitudes, values and feelings, as well as behaviors -- and doing so through intrinsic means. (Michigan Department of Education, 1973, p.1)

The Senate of the State of Michigan promoted environmental education in Concurrent Resolution No. 69 of June 1971. The Environmental Education Act, Public Law 91-516, of October 1970 further endorsed environmental education,

emphasizing the broad scope:

> . . . the educational process dealing with man's relationship with his natural and man-made surroundings, and including the relation of population, pollution, resource allocation and depletion, conservation, transportation, technology and urban and rural planning to the total human environment . . . (U.S. Congress, 91st, October 1970: Environmental Education Act).

Acquisition of knowledge about the environment is necessary but not sufficient. Indeed, education is likely to serve in resisting persuasion rather than promoting change from traditional patterns of belief and environmental conservation is a departure from the established frontier ethic of development.

Sources and potential sources of information about environmental issues need to be considered in conjunction with the educative programs. The ubiquitous mass media are at least as important in affecting environmental attitudes as are formally conducted educational programs, probably most effective in distributing information about the acceptable norms of society.

While the apparent effects of mass media on environmental attitudes of general audiences have been published, there is little to indicate relationships between mass media and the professional behaviors of teachers in the environmental arena. Assessment of the use patterns, of a continuing nature, could indicate the potential for influence of various media on the continuing development of teacher beliefs and attitudes.

The school classroom is a unique context. It serves

a dual communication function of mass medium and interpersonal medium, with the teacher as a regulator, gatekeeper and model for the pupils. It is appropriate that teachers should be a focus of environmental education efforts and that programs for the development of environmentally effective teachers should be examined.

The information developed in this study offers a basis for reexamining environmental education programs directed specifically at teachers and prospective teachers.

Literature Review

Following the first appearance of the term environmental education in 1968 (Swan, 1975), many attempts were made to define the scope of the subject. The Environmental Education Act, Public Law 91-516, of October 1970, offered as a definition:

> . . . the educational process dealing with man's relationship with his natural and man-made surroundings, and including the relation of population, pollution, resource allocation and depletion, conservation, transportation, technology and urban and rural planning to the total human environment . . . (U.S. Congress, 91st, October 1970: Environmental Education Act).

This led educators to develop a variety of goals descriptions for the topic which Johnson (1977) found lacking in cohesiveness and broad acceptability and in need of clarification. A thorough set of goals statements for curriculum development were subsequently formulated by Hungerford, et al. (1980).

Early emphasis on a base in biophysical ecology

rapidly expanded to encompass "ecological psychology" (Barker, 1968), "social ecology" (Binder, et al., 1975) and "environmental psychology" (Baum, et al., 1978).

While this broadening and goal-development was taking place, practitioners of environmental education in the classroom continued to structure their teaching around biology and biophysical concepts (Calcote, 1976; Childress, 1978; Carrington and Davis, 1980) with some extension into ill-defined awareness, recognition, appreciation, motivation, concern, and positive attitude.

Much of the emphasis in the classroom and out-of-school excursions on biophysical ecology rather than the broader concepts of environment were explained as lack of teacher understanding of the nature of environmental education (Hepburn and Keach, 1974) and that "Ecology is a science and is not value-laden; environmental decision-making most certainly is!" (Hungerford, 1975). Further, classroom and community approaches to the resolution of environmental issues seemed to be more successful when directed toward specific situations which did not conflict with community value systems (Tanner, 1974; Grunig and Stamm, 1979). Selected nature-study topics within a community were often found to be relatively "safe" whereas social topics were frequently considered treacherous (Murch, 1971; Schuman, 1972; Tichenor, et al., 1980).

With research focused on classroom practices and knowledge-gain, there was little in the literature to indicate

the perceptions which teachers held as to the curricular scope of environmental education. Further, with many methods in use to expand teachers' views of environmental education, little effort was made to describe the success (or failure) of these methods.

A useful statement summarizing the purposes of environmental education is that of Pettus (1976, p. 48):

> The goal of environmental education is to bring about informed environmental policies for society which will be compatible with the maintenance of a suitable planetary environment.

The literature consensus is that a "favorable attitude" is requisite to meeting this goal and that environmental education can and should be directed toward development of that favorable attitude concerning the planetary environment.

Some writers, such as McNelly (1973), seemed to contend that favorable attitudes would arise directly from a sound information base; one of the variables which Roth (1979) found most significant as influencing environmentally favorable behavior was knowledge. McNelly's view seems to parallel that of Ritz (1977) that getting teachers involved and active on a personal level would naturally lead them to become environmental educators.

Research does not always support the view that information leads to favorable attitudes as witnessed by Stamm and Ross (1966), Swan (1970), Tichenor and Bowers (1971), Stamm and Bowes (1972) and others. Burrus-Bammel found knowledge and attitudes uncorrelated in 1978 but

correlated in 1979 (Burrus-Bammel, et al., 1980). This last may have been more closely related to relevance of the information (knowledge) than to attitude expressions (cf. Leftridge and James, 1980).

Favorable attitudes may be less stable showing slightly reduced numerical ratings with increasing knowledge (Kupchella and Levy, 1975), a view supported by Pettus (1976) who found some evidence of an inverse relationship. Pettus also found that "Private environmental attitudes are independent of public environmental attitudes . . . ." The Borden and Schettino study (1979) found "feelings" as important as knowledge, concluding that cognitive and affective aspects were substitutable in causing behavior change.

Many efforts at environmental attitude measurement have been made to determine if environmental education programs elicit change. Most of these have demonstrated that intensive programs (treatments) do indeed result in more positive attitudes, according to the measuring instruments, when applied to students. However, when applied to teachers, Wileman (1976) found no basis for concluding that treatment affected environmental attitudes. Hounshell and Liggett (1976) reported changes in student attitudes but did not report on the teachers. Perhaps a different treatment program is needed for teachers.

Another consideration was expressed by Kelman (1958) that attitude changes by teachers might be less durable than those of students in the absence of surveillance, meaningful

relationship or relevance.

Considering that intervention or guidance in interpretation has a strong influence on the retention of information by children (Corder-Bolz and O'Bryant, 1978) and that

> . . . teachers are important representatives of the attitudes toward which children are socialized. They also transmit ideals of citizen behavior and teach some of the skills necessary to fill these requirements . . . (Hess and Torney, 1968, p. 15).

it is valuable to know the attitudes teachers carry into the classroom.

Foerstel (1976) has been one of the few researchers to examine the attitudes of a general population and teachers at the same time, although that was not his primary intent. His work dealt with specific problems rather than more generalized attitudes. While he found problem-ranking consistency within each group, he found little congruence between groups. A conclusion which may be drawn from his study is that perception of environmental problem severity varies to such a degree that extrapolation from a group of students, parents, teachers, or environmentalists to any of the other groups is not valid, even within the same community. There may be some congruence between groups if the attitudes measured are more general than specific.

That students and their parents will not necessarily agree on specific issues has also been suggested by Connell (1972). A range of acceptable beliefs is quite likely gained from parents but patterns of mass belief are more likely

sociological in origin than familial. Connell's thesis was supported by Friedman, et al. (1972). These suggestions and especially Foerstel's findings were strongly supported by McTeer (1978). The differences in attitudes and acceptable solutions to problems between students, teachers, and the community at large may reflect the relevance of Leftridge and James (1980), the "situational antecedents" of Grunig and Stamm (1979) and the required "degree of commitment of personal resources" of Ramsey and Rickson (1976). These differences may require adjustment in teacher-training programs so that the individual teacher may learn to adapt to student and community needs for more effectiveness in environmental education programs. (Cf. Tanner, 1974)

In approaching the attitude-behavior relationship, a study by Weinstein (1972) indicated a need to combine attitude toward an issue and attitude toward an action rather than either alone to suggest behavior predictability. He proposed that a negative action attitude would probably prevail over a positive issue attitude. Further, he found that a positive action attitude and a positive issue attitude did not make for a reliable predictor of behavior either. This was supported by Schuman (1972) in his "situational variability" which usually resulted in compromise where the positions taken tended to reveal relative strength of values.

This difference in attitudes between the issues and the actions was further emphasized by Peyton (1977) when he found that less than half of the pre-service teachers

(elementary education students) in his study engaged in either individual or group actions favorable to the environment and that the participants in general considered action involvement on their part peripheral to environmental education. Harvey (1976) avoided specifying actions as expected outcomes of environmental education referrring to competence and dedication, the "intentions" of environmental literates, as the outcome goals. Ray (1973) suggested that learning followed attitude change which followed behavior change, the attitude change bolstering the choice of behaviors. All of these studies suggest reasons why measured attitudes and demonstrated behaviors do not necessarily show statistical relationships.

But personal actions and professional (teaching) behaviors may differ. Ritz (1977) implied that personal actions and classroom practices fell within the same affective-behavioral construct, although Cummings (1976) saw the classroom behavior as a distinct pattern, separate from external behaviors. Much of the reluctance of individual teachers to incorporate environmental education programs into their continuing classroom conduct has been viewed as a perceived low level of their own competency (Peyton, 1977; Ritz, 1977; Bozardt, 1976; Cummings, 1976; Hungerford, 1975; Howie, 1974).

The great number of college majors and minors in environmental science, environmental education, pre-service environmental courses for teachers-to-be, and in-service

courses for practicing teachers may alleviate this perceived competency restraint (Trent, 1976). Actual application in the classroom, however, may be dependent on community and administrative policies. McCaw (1979/80) found teachers were interested in environmental education in-service training but only after thorough development of basic curriculum subjects.

Cummings (1976) has adopted a particularly interesting approach in viewing environmental education as a market. He points to the student as the ultimate consumer of the content with the teacher as the primary consumer of the materials of instruction. His study found 70 percent of the teachers surveyed were adopters of environmental education curricular materials. This latter figure compares with the 57 percent cited by Wint (1977).

The Cummings study is also of special interest in evaluating curriculum package adoption potential. He found that environmental education program packages were most likely to be adopted if they required little teacher-preparation time, consumed little class time and offered considerable direction to the students. As Cummings put it, the appeared to be "a desire to 'spice-up' the existing curriculum rather than to make substantive changes." Observations by Bozardt (1976) also emphasized that attitude.

Acceptability of attractive packages has been widely noted, typified by Carrington and Davis (1980). And there apparently needs to be little concern that there would be a

decrease in information-gain with popularization of the content (Hunsaker, 1979). Indeed, Cronholm and Sandell (1981) suggest a very wide acceptance of popular styles of presentation of scientific information, without loss of potential for growth in knowledge but decided gain in potential.

McNelly related information, attitudes and behaviors in a simple and basic statement:

> Information provides the raw material on the basis of which people form their beliefs, which in turn provide the basis for their attitudes and behaviors. (1973, p. 31)

He proceeded to construct a conceptual case for information building a set of beliefs which, when related, formed an attitude structure which then predisposed the holder to respond in a favorable or unfavorable manner. McNelly did not assume a direct or causal relationship in this system which would necessarily result in the predisposed behaviors, but credited the situational variables with the final control. Nonetheless, he strongly promoted the proposition that information is the basis for attitudes and attitude changes with the information receiver playing an active role in the processing and the structuring. On the other hand, the 1966 Stamm and Ross study in Wisconsin found that "environmental knowledge bore no relation to community members' attitudes," a position confirmed by Tichenor, et al. (1980).

The role played by environmental educators in the overall communication system disseminating information about environmental matters is distinctive. The term "quasi-mass communication" cited by Davison, et al. (1976, p.122), seems

particularly suited. The fairly standard messages delivered to classrooms across the country make teaching resemble a mass communication system. At the same time, the messages are presented in face-to-face encounters with some opportunity for audience (and parental) feedback and so teaching resembles interpersonal communication. The peculiar nature of this blend seems to warrant the continued use of the quasi-mass communication terminology.

The environmental educator may be an effective regulator and gatekeeper in the quasi-mass communication system involving students. As educator, the teacher serves also as a redistribution system which McNelly (1973) considered of vital importance to the total communication process. There is also a special opportunity for co-orientation of teachers and pupils with the potential for agreement, accuracy and congruency relationships (Chaffee and McLeod, 1968).

Witt (1973) recognized the complex nature of environmental communication and expanded on traditional models of communication. He was especially concerned that even the Westley-MacLean model did not accommodate, in science and environmental communication systems, to receivers being sources at the same time. The Witt model readily accommodated the agenda-setting influence of environmental educators, the importance of which was noted by Schoenfeld (1977), which other models did not.

The complexity of environmental mass communication

and its possible effects, and the questionable potential for changing environmental attitudes, was underlined by Stamm (1972). He suggested that environmental education efforts would have little or no cognitive change effects involving high salience objects, a view supported by Mazur (1981).

If the environmental attitudes of teachers and, through them, their students can be changed, reinforced, modified, "agendized" or otherwise manipulated by mass communication, it would seem appropriate to identify the strength of media impingement. Sellers and Jones (1973, p.53) cite an instance where mass media were avoided in an environmental influence campaign and efforts to sway attitudes were directed at the interpersonal and quasi-mass communication systems. Stamm (1972) described selected environmental campaigns and the communication problems which became evident during the efforts. Leahy and Mazur (1980) have explored many of the reasons for the antagonisms.

But shifting emphases in mass communication research suggest the influence may be less that of a potential change agent than that of a reinforcer, especially of a conservative bias (cf. Mazur and Conant, 1978). The uses and gratifications interpretation of mass media evaluations places emphasis on the functions the media serve rather than the effects of mass communication systems (Kippax and Murray, 1980). Palmgreen, et al. (1981), and others, have found that decisions in use of mass media, especially those aspects (and programs) offering information, are strongly related to

audience perceptions of gratifications received from media use.

Those who have observed teachers in environmental education workshops, of short or long duration, may be disturbed by parallels with the Kippax and Murray study of need gratification and perceived utility. They found the most important needs when audiences turned to mass media were, in descending order: self-identity and social contact, self-gratification, then information, followed by entertainment and diversion.

There are few studies in the literature focusing on the effects on teachers of training programs in the conduct of environmental education. Acceptance of curricular goals or incorporation of environmental education goals into existing curricula have not been widely noted. Even when confined to the realm of biophysical ecology, there has been a lack of reported measurement of environmental education practices in the school program. This study will add to knowledge of teacher attitudes and behaviors and some effects of influences on those attitudes and behaviors.

CHAPTER II

METHODOLOGY

One of the assignments given to teachers in Michigan schools by the Michigan Department of Education is that of systematically educating the citizenry about the environment. This study examined self-selected samples of teachers with an expressed interest in environmental education as to their attitudes toward environmental issues, their personal actions in areas of environmental conservation, their tendencies to conduct environmental education in their classrooms, and their sources of information which influence their own behaviors and from which they influence the attitudes and behaviors of their pupils.

With emphasis given to changes which may have occurred over time, five dimensions were chosen for study:

1. Attitudes toward environmental affairs -- the intensity of positive attitudes toward the environment
2. Perception of the scope of environmental education -- inclusion of subject areas within the overall framework of environmental education
3. Personal environmental actions -- the extent of personal involvement in environmental improvement efforts
4. Professional activities in environmental education --

the extent of involvement in environmental education with their pupils

5. Use of mass media information sources on a continuing basis -- an assessment of media use and perceptions which contribute to the development of beliefs and attitudes.

This investigation expanded on an earlier study in which an entry profile of enrollees was constructed (Covert, 1980) and responded to a question voiced by a faculty member of the Teachers' Environmental School, Dr. Jane Renaud:

> Is this program worthwhile or are we spinning our wheels, having no impact on the classroom, deceiving ourselves as to the value of what we are doing here?

Six hypotheses were central to this study.

Hypothesis 1. There will be no difference between environmental conservation attitudes before and after an intensive environmental education experience.

Hypothesis 2. There will be no difference between perceptions of the scope of environmental education before and after an intensive environmental education experience.

Hypothesis 3. There will be no difference between personal actions favorable to the environment before and after an intensive environmental education experience.

Hypothesis 4. There will be no difference between professional environmental education practices before and after an intensive environmental education experience.

Hypothesis 5. There will be no difference between information source-preferences for resolution of conflicting information about environmental matters before and after an intensive

environmental education experience.

Hypothesis 6. There will be no difference between mass media information-quality perceptions before and after an intensive environmental education experience.

Population Selection

The populations selected for this study consisted of teachers attending any one of four one-week "Teachers' Environmental School" (TES) workshops conducted during the summer of 1978 and of two conducted during the summer of 1979. Each of the 1978 workshops was conducted by a different Michigan university: Michigan State University, Eastern Michigan University, Wayne State University, and Central Michigan University. In 1979 Eastern Michigan joined with Michigan State and Central Michigan joined with Wayne State in conducting TES workshops. A description of the Teachers' Environmental School and its staffing is in Appendix A.

Because the TES was designed to assist teachers in beginning or improving environmental education in their classrooms, it was assumed that the populations would be demonstrating through attendance a special interest in their biophysical surroundings or environmental education or both. The workshop experience required commitment to a five day, participatory, residential program during the summer, between academic years.

Enrollment in this program would then distinguish the study groups from an average of teachers. Results should

not, therefore, be extended to all teachers. In addition, although it is tempting to apply the findings to teachers who, in other years, may choose to attend the TES, the groups measured were not randomly selected and may thus be subject to confounding influences, limiting the generalizability of the study. Interaction of the first measurement on the effect of the TES experience may have occurred but it was expected to be sufficiently subordinate to self-selection bias to be ignored as a further threat to experimental validity.

Experimental Design

Two groups of teachers attending the TES were selected for pretesting on entry to the School and posttesting several months later.

One hundred eighty persons attending four sessions of the TES during the summer of 1978 were asked to complete an environmental attitude and action profile questionnaire as an opening activity of the week-long workshop program. Of these, 123 were teachers making up the first study group. In the summer of 1979, one hundred twenty persons were asked to complete the same questionnaire. Seventy seven of these were teachers who then made up the second group.

On 4 November 1979, the same questionnaire was mailed to all members of both groups. The questionnaire, containing 68 numbered items, was accompanied by a cover letter again stating the purpose and source of the request. Both the

questionnaire and the cover letter are in Appendix B.

This schedule was expected to minimize the effects of intervening events on the second measurement and reduce or eliminate selection-maturation interaction. Loss of some respondents between first and second measurements was considered a possible source of bias with potential for exacerbation in analysis because of respondent anonymity.

With self-selection bias at work in both the initial and second testing, it was anticipated that before and after group-differences would be intensified, perhaps indicating differences where there were none. Conservative statistical tests and substantive judgments based on the two different time spans (four and sixteen month intervals) were expected to alleviate interpretation of this variable.

Assumptions and Limitations

In the design of this study, it was assumed that the populations measured would be representative of teachers who would choose to participate in other years. It was also assumed that the self-reports would be reasonably accurate portrayals of the respondents' true self-perceptions. Further, it was assumed that subject bias in response would be normally distributed through all groups measured.

A limitation which must be emphasized is that the data collected and its interpretation represent only the populations and TES programs specified; no extension should be made to populations selected on other bases or TES programs

which depart substantially from those included in this study.

In the measurement of attitudes, no distinctions were made between beliefs, attitudes or values (cf. Gross and Niman, 1975). The measurement and effects of knowledge changes on other dimensions were considered beyond the scope of this study. No attempts were made to explore the behavior-to-attitude sequence of Ray (1973).

While the "treatments" would be expected to vary from week to week and from year to year, the consistency of goals within the TES program and faculty members, and the year-group analysis method were considered sufficient for the purposes of this study.

The participants were urged in the introduction to the questionnaire to "answer not what you think you should, but your actual thoughts and practices." Nonetheless, bias toward the expected views of the researcher and the Teachers' Environmental School undoubtedly appeared. It is also probable that the admonition and efforts to report accurately and without bias faded to some extent during the time it took to complete the questionnaire.

The Measuring Instrument

The measuring instrument used in this study was developed as a questionnaire to seek data along the five dimensions stated earlier. Consisting of 68 numbered items (see Appendix B), it elicited self-reporting based on facts recalled and self-perceptions.

Environmental Attitude Measure

The attitude measuring instrument applied in this study was taken from George (1966) who modified Whiteman's (1965) questionnaire which had been built on the work of Laug (1960). A description and discussion of the George study is in Appendix C.

George tested his instrument on trial-groups and compared the results with those of Whiteman and Laug, concluding that the attitude questionnaire was acceptable as an attitude measuring device and was reliable. This prior development including trial-group testing suggested that the 32-item measure had face validity and surveyed the attitude domain sufficiently. None of the investigators reported their testing for internal consistency nor were statistical procedures employed to estimate the instrument's reliability.

Responses of the entry groups in this study were examined, as separate groups and as a whole, for validity, reliability, normality, and homoscedasticity. A more thorough discussion of this testing in in Appendix D.

The Kolmogorov-Smirnov one-sample test for goodness of fit showed no basis for rejecting the assumption of normality. Hotelling's T^2 test, analysis of variance F tests and comparisons of the two indicated homogeneity of variance was a reasonable assumption.

Perceived Content Measure

There has often been difficulty with attempts at defining environmental education, among teacher groups as well as others. Many highly regarded advocates have emphasized biology while others have added the physical aspects of the earth to their focus. Development of the environmental concept in other disciplines such as sociology and economics has led still others to embrace a holistic view, that environmental education has a reality independent of and greater than the sum of its parts.

The perception held by the teachers in this study as to the scope of environmental education was measured by the list of school-subject areas in item 1 of the questionnaire. A discussion of this list and its derivation is in Appendix E. Response to such a list does not, of course, measure holistic perception. It does measure a perceived scope of environmental education in the school setting.

The Kolmogorov-Smirnov test failed to reject the assumption of normality, homoscedasticity was supported, and reliability was high (see Appendix E). Construct validity depends on application and on correlation between perceived content and classroom practices over repeated studies.

Personal Environmental Actions

Four categories of personal involvement were chosen to reflect public and private actions in verbal and physical forms which would favor environmental conservation. The

questions included in this study, continued from the prior work, were intended to explore the domain, not sample it thoroughly, to see if personal actions were in consonance with attitudes and to search out changes which might have occurred.

The questions ranged from public airing of environmental views through progressively more private expressions, and from active participation in public environmental conservation projects to private activities exemplified by recycling. These topics appeared to place no special financial demands on the respondents as would many other topics such as some of the energy conservation projects.

Professional Environmental Education Practices

Several measures were selected to reflect the extent of activity in environmental education. Self-reporting of time spent on environmental education in the classroom was a primary measure to be correlated with attitude and perceived-content scores. Situational influences and perceived expectations were expected to affect these three dimensions similarly. Several approaches to the anticipated bias of this self-report were considered but the straightforward approach was thought to be sufficiently useful. Additional questions would offer interpretive support.

Reports on specific activities were requested so as to include the common "outdoor education" programs. Inclusion of all activities was intended such as scouting and 4-H and

any special functions such as community campaigns. The choice here was to insure inclusion of all activities which the respondent might consider environmentally-related and which fell within the realm of the professional teacher-pupil relationship.

Use and Perceptions of Mass Media

The sources which teachers use to obtain the bulk of environmental information and from which they influence their students have not been well-defined. Work in behavioral ecology suggests that manipulation, persuasion and advertisement are more important than information transmission, often specifying television as the principal influence with other commercial mass media following closely behind (Wilbur, 1979).

Four mass media were selected as the base in this study for their ready availability, wide use and currency. Books on environmental matters were considered by the researcher as rapidly outdated, probably used intermittently, and generally supplanted in their effects by the more frequent impingement of the other media.

Exposure quantities were desired but perceptions of quality as well. Changes between entry and later perceptions of objectivity and credibility rankings of the media might reflect changes in viewer/listener/reader skepticism or acceptance with increased knowledge of specific subject areas acquired during the intervening period.

With the strong differences in physical form, sensory

impact, commitment to consumption, and scale of treatment between the four mass media in this study, it was desirable to use a common denominator for comparative purposes in evaluating objectivity. The premise was adopted that these populations could identify and evaluate the reporters of information and that the reporters could then serve as the comparison base across the media.

Respondents were also asked to indicate their general perceptions of media credibility, again employing a question form inviting comparison.

A variety of information sources was selected for a broad evaluation. An essential purpose was to test the relative position of colleagues as a representative of interpersonal information sources and formal classes as representative of quasi-mass media. Workshops and seminars would have been preferable in the latter instance but the inherent bias of the entry environment would have been prohibitively high. Formal classes as a category was in itself a contaminant. The terms up-to-date, accurate and thorough were used in the questionnaire but abbreviated for reporting convenience into the term reliability.

Data Collection and Processing

Data collection was conducted in three stages during 1978 and 1979. Entry level responses for each year were gathered as a part of the first, orientation meetings of the TES sessions, before instructional programs of the five-day

workshop began. The same questionnaire was mailed to the same participants in November of 1979. Response from the summer 1978 group was 46 percent and from the summer 1979 group 53 percent. A follow-up mailing was not conducted as middle or late winter would offer a response environment markedly different from that of the first wave of returns.

Responses of each person were coded by the researcher and analyzed by statistical procedures, computer performed. Data analysis made use of the Statistical Package for the Social Sciences (SPSS) release 8.0 available to the California State University, Fullerton, using a Control Data Corporation CYBER computer system. The codebook for data entry is included in Appendix F.

A critical value at .05 significance was chosen for comparisons and tests of relationships as the most reasonable balance between Type I and Type II errors.

In the data arrays and references to the four groups in this study, abbreviated identifications are used. The group measured on entry to the TES in 1978 is labelled 1978E. Likewise, the 1979 entry group is 1979E. The groups measured in November 1979 by mail are identified by their year at the TES and G, representing graduate of the school. Comparisons are made then between the two entry groups, 1978E and 1979E, and between entry and graduate characteristics of the same group, 1978E to 1978G and 1979E to 1979G. Table 1 illustrates the group identification flow.

TABLE 1

GROUP IDENTIFICATION AND
DATA COLLECTION POINTS

Year Group	1978	1979	
	First Response	First Response	Second Response
1978	1978E		1978G
1979		1979E	1979G

CHAPTER III

RESULTS OF THE INVESTIGATION

The questions posed in the formulation of this study may be broadly stated as: What do actively interested teachers think about environmental issues?; What do they do personally?; What do they do with their students?; and, What are their most frequently encountered and respected sources of information?

Environmental Attitudes

The three components of attitude measured in this study are presented in Table 2.

TABLE 2

ENVIRONMENTAL ATTITUDE PROFILE

Group Scores

		1978E N=123	1979E N= 77	1978G N= 53	1979G N= 42
Attitude Measure 0-128	mean	102.30	105.32	104.34	107.74
	sd	13.82	10.71	10.08	10.53
	.95 C.I.	99.83-104.77	102.89-107.76	101.56-107.12	104.45-111.02
	range	74-124	58-127	85-125	82-128
Environmental Education Content Perception 0-28	mean	16.17	19.38	16.55	18.67
	sd	6.72	7.20	7.18	7.29
	.95 C.I.	14.97-17.37	17.74-21.01	14.56-18.53	16.39-20.94
	range	4-28	5-28	4-28	4-28
	(% at 28)	(13)	(25)	(13)	(26)
Crisis View (0=not 1=slight 2=moderate 3=serious)	mean	2.75	2.84	2.77	2.90
	sd	.47	.40	.47	.31
	.95 C.I.	2.67-2.84	2.75-2.94	2.64-2.91	2.79-3.00
	range	1-3	1-3	1-3	2-3
	(% at 3)	(77)	(86)	(79)	(90)
			mail response rate:	46%	53%

Attitude Measure

The attitude measure used in this study offered a special advantage in making available summary data from 1965 (see Appendix C). These prior groups were the 1965 teachers entering the Teachers' Environmental School, and the teachers who had attended the 1964 TES and were then measured one year later. Data are not available for current statistical analyses comparing the earlier groups with the groups measured in this study, but both groups scored close to their later counterparts as shown in Table 3.

TABLE 3

ATTITUDE MEASURE SCORES BY GROUPS

Year Group	First Response (E)				Second Response (G)			
	N	Mean	.95 C.I.	sd	N	Mean	.95 C.I.	sd
1964					105	107.18		
1965	241	104.76						
1978	123	102.30	99.83-104.77	13.82	53	104.34	101.56-107.12	10.08
1979	77	105.32	102.89-107.76	10.71	42	107.74	104.45-111.02	10.53

Reliability of the attitude measure was estimated using coefficient alpha (Cronbach). Consistently high values for each group and combined groups, 0.848 and higher, suggested consistency sufficient for the purposes of this study.

Factor and item analysis revealed that the 32-item measure tended to group 17 items into two principal factors

having correlations of 0.845 and 0.749 with the total measure. The effects of these separate factors are noted subsequently.

The two principal factors of the total attitude measure may be expressed in summary statements.

Factor 1. The use of effective environmental protection measures will not slow progress in our country. Environmentalists have been unfairly accused of being too cautious and standing in the way of progress. On the contrary, most environmentalists communicate needed information about our resources. We cannot rely on science to find substitutes for natural resources when the original supply is exhausted and we cannot move on to other areas when resources in one area are used up.

Conservation of natural resources can bring results which will benefit people today, not just future generations. If we, as students, take part in environmental conservation, we will receive valuable results from our labors. Although I am only one person, I can do something to improve the environment. I am willing to trade some of my own social activity time to further the cause of the environment.

(Questions 6, 8, 10, 17, 18, 23, 25, 26, 27.)

Factor 2. The great enemy of the environment is indifference on the part of the people. We show selfishness and lack of consideration in wasting our resources; we are an extremely wasteful nation. The public schools of our nation should help by spending more time in environmental education. Environmental education should also leave the classroom and be studied in the field where it will be generally more effective.

Some businesses are against environmental protection measures because they feel the measures will restrict

their activities. But, if we do not take effective environmental protection measures, our country will begin to weaken and decline as a major world power. (Questions 9, 15, 20, 24, 30, 31, 33, 37.)

For convenience, factor 1 may be labelled the environmental conservation factor and factor 2 as the socio-political factor. The 15 excluded items slightly elevated the total-measure score and reduced the standard deviation, an expected consequence of the demand-response characteristics of those items.

The interest is in change over time. The t-test data in Table 4 suggest that there is no statistically significant difference using the total measure or either of the two factors as the bases for comparison.

TABLE 4

ATTITUDE MEASURE COMPARISONS,
TOTAL MEASURE AND FACTORS, t-TESTS

Groups Paired	N	Mean	sd	F	p	df	t	p
Total Measure								
1978E	123	102.30	13.82	1.88	.011	174	0.97	.167
1978G	53	104.34	10.08					
1979E	77	105.32	10.71	1.03	.924	117	1.18	.120
1979G	42	107.74	10.53					
Factor 1								
1978E	123	30.53	5.17	1.38	.191	174	0.14	.890
1978G	53	30.64	4.40					
1979E	77	31.42	4.32	1.18	.523	117	0.82	.412
1979G	42	32.12	4.70					
Factor 2								
1978E	123	15.91	2.72	1.77	.021	174	0.85	.397
1978G	53	16.26	2.04					
1979E	77	25.47	3.37	1.04	.921	117	1.20	.233
1979G	42	26.24	3.31					

Perceived Content

The scope of environmental education as perceived by the teachers studied was measured by the list of school-subject areas in item 1 of the questionnaire and listed in Table 5.

TABLE 5

PERCEIVED CONTENT RANK

Percentage of respondents selecting each subject for inclusion

Subject Area	All Groups	1978E	1979E	1978G	1979G
1 Conservation	99.0%	100.0%	97.4%	100.0%	97.6%
2 Ecology	98.6	98.4	100.0	98.1	97.6
3 Nature Study	96.3	97.6	96.1	96.2	92.9
4 Outdoor Education	95.3	96.7	94.8	96.2	90.5
5 Biology	92.5	93.5	92.2	88.7	95.2
6 Geology	87.8	87.0	96.1	75.5	90.5
7 Botany	87.1	87.8	90.9	77.4	90.5
8 Zoology	83.7	83.7	90.9	75.5	81.0
9 Agriculture	80.0	76.4	85.7	75.5	85.7
10 Geography	73.6	66.7	85.7	67.9	78.6
11 Chemistry	66.4	62.6	70.1	56.6	83.3
12 Economics	62.7	54.5	66.2	69.8	71.4
13 Health Science	60.0	53.7	62.3	62.3	71.4
14 Nutrition	57.6	52.8	70.1	50.9	57.1
15 Animal Husbandry	56.9	48.8	71.4	52.8	59.5
16 History	54.9	45.5	67.5	52.8	61.9
17 Family Management	51.9	43.1	59.7	50.9	64.3
18 Sociology	50.5	39.0	63.6	49.1	61.9
19 Business	48.1	40.7	53.2	50.9	57.1
20 Political Science	48.1	38.2	53.2	54.7	59.5
21 Physics	47.8	39.0	66.2	39.6	50.0
22 Vocational Educ.	46.1	44.7	46.8	43.4	52.4
23 Physical Education	41.7	38.2	57.1	34.0	33.3
24 Psychology	38.6	27.6	49.4	39.6	50.0
25 Art	34.9	33.3	40.3	28.3	38.1
26 Mathematics	33.9	27.6	46.8	28.3	35.7
27 Language	26.4	23.6	32.5	18.9	33.3
28 Music	22.4	16.3	31.2	20.8	26.2

The frequency ranking of each topic is presented in Table 5 with each of the four groups compared to a rank order determined by the total population. There is consensus in giving high priority to the first nine topics with particular

emphasis on the first five: Conservation, Ecology, Nature Study, Outdoor Education, and Biology. These rankings correspond with most traditional bases for an approach to environmental education. There is also consensus, although more variable, in the bottom-of-the-list ranking.

TABLE 6

PERCEIVED CONTENT,
NUMBER OF TOPICS CHOSEN BY GROUP

	All Groups	1978E	1979E	1978G	1979G
mean	17.43	16.17	19.38	16.55	18.67
sd	7.12	6.72	7.20	7.18	7.29
range	4-28	4-28	5-28	4-28	4-28
.95 C.I.		14.97-17.37	17.74-21.01	14.56-18.53	16.39-20.94
N	295	123	77	53	42
modes	12 (6%) 16 (6%) 28 (18%)	15 (12%) 28 (13%)	20 (10%) 28 (25%)	28 (13%)	28 (26%)

Table 6 compares the average number of topics chosen by each group. Outstanding is the high percentage choosing all 28 topics as important to environmental education. Equally important is that 75 to 85 percent have a less than holistic view, as measured by this item.

TABLE 7

PERCEIVED CONTENT COMPARISON
t-tests by groups

Groups Paired	N	Mean	sd	F	p	df	t	p
1978E 1978G	123 53	16.17 16.55	6.72 7.18	1.14	.552	174	0.33	.368
1979E 1979G	77 42	19.38 18.67	7.20 7.29	1.03	.906	117	-0.51	.305

When the groups are compared statistically, as in Table 7, the differences between entry and subsequent views do not appear to have changed.

"Crisis" View

A third measure of environmental attitude was a much more general one. It was posited during questionnaire construction that there would be a difference in view toward the seriousness of a problem when that problem was narrowly defined and when it was broadly described. A rating question was posed concerning environmental problems in general.

> Ecology and environment have become household words in recent years. How do YOU view the "environmental crisis" we hear so much about?

There was a strong likelihood for bias in responses to this question in light of the environment in which the entry responses were made and the assumed predisposition of the mail responders. Figure 1 and Table 2 show a high percentage of each group considered the "environmental crisis" a serious problem. Partly due to this high-value initial response, the slight increase was not significant (Table 8).

TABLE 8

"CRISIS" VIEW COMPARISON,
t-tests by groups

Groups Paired	N	Mean	sd	F	p	df	t	p
1978E	122	2.75	0.47	1.01	.978	173	0.25	.400
1978G	53	2.77	0.47					
1979E	76	2.84	0.40	1.71	.072	113	0.75	.226
1979G	39	2.90	0.31					

Range: 0=No Problem to 3=Serious Problem

Personal Environmental Actions

Self-reports of environmentally supportive behaviors were acquired in four general categories. Public defense of environmental views needed no more than vocalization to receive an affirmative response. The attempts to influence which were itemized would extend beyond customary personal activities and interpersonal exchanges, requiring some knowledge and ability to communicate knowledge. Participation in public projects would expect overt action and social approval. Waste recycling could be performed more anonymously, while retaining social sanction and requiring action. These latter two categories might also reflect teacher activity in their promotion.

TABLE 9

PERSONAL ACTIONS PROFILE
Percentage Participation in
Environmentally Favorable Actions

	Participation percent			
	1978E	1979E	1978G	1979G
Publicly Defend Views	52.5	58.4	66.0*	47.5
Attempt to Influence:				
Local Government	23.6	36.4	26.4	47.5
Legislation	33.3	31.2	43.4*	30.0
Non-gov't Institutions	13.8	17.1	17.0	22.0
Participate in Public Projects	69.9#	84.4	81.1	80.0
Actively Recycle Wastes	63.4#	81.8	83.0	87.2

* change significant at less than p=.05
\# before Michigan's "bottle law"

The foremost changes to note in Table 9 were the inclination to express personal views and the probable effects of Michigan's "bottle law" prompting more recycling activity and increased participation in cleanup campaigns.

The increase in public defense of their environmental views by the 1978 group was significant (at p=.01) but the decrease in the 1979 group was not. Apart from statistical significance, the general increase in attempts to influence public and non-public bodies was important: the 1978 group average increased from 23.6 to 28.9 percent participation and the 1979 group climbed from 28.2 to 33.2 percent.

The subdivisions of participation in community projects and personal activity in waste recycling are elaborated in Table 10. The question allowed more than one answer so the several combinations are included. Other categories could have been used but the three chosen, cleanup campaigns, beautification projects and environmental protection projects, were considered as typically common classifications and sufficiently all-inclusive to offer meaningful responses. No attempt was made to clarify the meaning of environmental protection project; it was included to encompass any activities requiring more intensive "feelings" about the environment than would be required by community cleanup and beautification projects.

Caution is needed in the interpretation of responses to this item. These projects are generally sponsored and organized by community groups or whole communities.

Participation would, then, depend on the opportunities available. Lack of participation may be a function of the community rather than the individual.

TABLE 10

PROJECT PARTICIPATION PROFILE
Percentage Participation by Subdivision

	Participation percent			
	1978E	1979E	1978G	1979G
Public Projects:				
None	30.1	15.6	18.9	20.0
Cleanup campaigns	22.8	18.2	24.5	17.5
Beautification projects	8.1	3.9	---	2.5
Environmental protection	4.1	3.9	11.3	7.5
Cleanup and beautify	14.6	11.7	13.2	22.5
Cleanup and protection	5.7	20.8	15.1	7.5
Beautify and protect	1.6	2.6	1.9	5.0
Clean, beautify, protect	13.0	23.4	15.1	17.5
Regularly Recycle Wastes:	*			
None	36.6	18.2	17.0	12.8
Paper	21.1	3.9	---	5.1
Bottles	5.7	13.0	20.8	7.7
Cans	---	2.6	---	5.1
Paper and bottles	22.0	6.5	15.1	17.9
Paper and cans	.8	3.9	1.9	5.1
Bottles and cans	.8	24.7	11.3	23.1
Paper, bottles and cans	13.0	27.3	34.0	23.1

* before Michigan's "bottle law"

It is apparent from Table 10 that beautification projects, alone, lost favor. There seemed to be a stronger tendency to become involved in cleanup campaigns and projects falling under the rubric of environmental protection, with perhaps a strong overlap in perception between these two. There was also an apparent trend toward involvement in more than one form of activity if there was any activity at all.

Recycling was undoubtedly influenced by the imposition of the "bottle law" in Michigan, enacted between the two entry times. There was also a strong tendency to shift from no or narrow recycling to multiple-category recycling.

As will be seen later, these increases appeared to be personal, not involving a teacher-directed student activity.

Environmental Education Practices

Several measures were used to reflect the extent of professional environmental education activity;

1. Perceived number of hours each week on environmental education within the school program;
2. Participation in outdoor learning programs;
3. Frequency with which the teacher involved students in environmental activities outside the school program;
4. Recent attendance at environmental education workshops;
5. Whether the teacher was a member of the Michigan Environmental Education Association, the professional organization of environmental educators in Michigan.

The reported decreases shown in Table 11 were unexpected considering the assumed predisposition of those responding. Perhaps the timing drew greater accuracy since the mail survey was received and returned during the school year whereas the entry questioning was conducted during the summer, in the TES surroundings, and dependent on uncertain recall. Membership in the Michigan Environmental Education Association (MEEA) apparently increased immediately after TES

attendance then declined from attrition, a point which the MEEA might work to rectify.

TABLE 11

ENVIRONMENTAL EDUCATION PRACTICES PROFILE, SUMMARY BY GROUP

	1978E	1979E	1978G	1979G
Conduct environmental education in school program				
Average hours per week	0.91	1.00	0.83	0.78
Conduct outdoor environmental learning in school program				
Participation percentage	74.8	78.7	74.0	76.3
Involve students in out-of-school environmental activities				
Participation percentage	59.7	58.1	49.0	43.2
Average times in last year	1.8	2.4	2.6	3.1
Attendance at environmental education workshops				
Average times in last year	0.58	0.52	0.62	0.95
Member MEEA				
Membership percentage	22.8	16.9	34.0	51.2

Time per Week

An especially pertinent question in attempting to measure environmental education practices was the amount of time these teachers spent environmentally educating students in their classrooms. Evaluation of response patterns leading to the data in Table 12 indicated considerable candor implying modest bias. Perhaps this was partly due to an inability of respondents to anticipate what might be considered the "right" answer. The companion question about average teachers in

their school offered an interesting comparison without special inference in this report.

TABLE 12

AVERAGE MINUTES PER WEEK OF ENVIRONMENTAL EDUCATION

	1978E N=123	1979E N= 77	1978G N= 53	1979G N= 42
Self-- extremes excluded				
mean	54.56	59.95	49.54	46.92
sd	68.69	57.89	57.12	59.22
range	0-300	0-300	0-300	0-250
.95 C.I.	40.17-68.94	45.25-74.65	29.29-69.80	21.91-71.92
n	90	62	33	24
Self-- all respondents				
mean	72.15	87.18	89.32	66.54
sd	118.81	138.95	129.00	123.02
range	0-650	0-800	0-500	0-600
.95 C.I.	47.68-96.62	52.75-121.62	46.31-132.34	16.85-116.22
n	93	65	37	26
Others				
mean	25.51	19.04	12.93	24.18
sd	34.51	23.24	11.23	33.92
range	0-200	0-100	0-35	0-150
.95 C.I.	17.88-33.14	12.81-25.26	8.58-17.28	10.77-37.60
n	81	56	28	27

A few teachers, mostly those who also identified themselves as specializing in environmental education programs, reported very large time quantities which inflated the mean values. Because of this, two sets of data have relevance and are included in Table 12 and in subsequent correlational analyses; one set reports the average of ordinary respondents in this study and the second includes those circumstances where a specialist may take care of environmental education for the whole school or school district.

With time estimates ranging from three-fourths of an hour to one hour per week spent on environmental education in the school program, advocates might be encouraged. However, these times represent from nine to twelve minutes in the five to six hour school day, 2.5 percent to 4 percent.

A statistical relationship was found between workshop attendance and the time spent in environmental education. The 1979 group showed, with modest strength, that a tendency to attend several environmental education workshops could explain fifteen percent or more of the reported time in the classroom.

TABLE 13

WORKSHOPS AND CLASSROOM TIME
Correlations

	1978E	1979E	1978G	1979G
chi square, p	.167	.0001	.296	.007
gamma	.375	.427	.509	.204
eta, time dependent	.321	.394	.607	.524
eta^2, time dependent	.103	.155*	.368	.275*

* significant

Out-of-School Activity

The intent of the question regarding out-of-school activity was to encompass all activities of an essentially extracurricular nature so as not to exclude rather than to avoid inclusion. Scouts, 4-H and other school-age activities were expected to be included as well as any special functions such as community cleanup campaigns. Specification of students was intended to confine responses to the

professional relationship of teacher-pupil.

Whereas there were no significant changes in the frequency with which the before and after groups conducted outdoor environmental learning experiences as noted in Table 11, there was decided significance in the tendency to involve students outside of the school program, Table 14.

TABLE 14

OUT-OF-SCHOOL ACTIVITY BY GROUP
Participation Percentage and Frequency

	1978E	1979E	1978G	1979G
Involved students out-of-school, percentage of participation				
mean	59.7	58.1	49.0*	43.2*
sd	49.3	49.7	50.5	50.2
.95 C.I.	50.7-68.6	46.6-69.6	34.5-63.5	26.5-60.0
n	119	74	49	37
Involved students out-of-school, number of times in last year				
mean	1.82	2.40	2.64*	3.06*
sd	2.26	1.36	2.20	1.98
.95 C.I.	1.39-2.24	1.98-2.83	1.73-3.55	2.01-4.12
n	71	43	24	16

*significant

Although fewer of these teachers, in both year-groups, involved their students in out-of-school environmental activities, the participating teachers did so a greater number of times to judge from their responses to the second survey. Apparently such extracurricular involvement is found worth repeating once tried.

In evaluating this response, it should be kept in mind that the question posed was general in nature and could readily have been interpreted to include a wide variety of

activities. There may also have been some overlap with the preceding question about outdoor environmental learning experiences--the most likely being inclusion of class work off the school grounds.

TES Attendance Influence

Sources which influenced the teachers to attend the Teachers' Environmental School are noted in Table 15.

TABLE 15

ATTENDANCE INFLUENCE BY GROUP
Percentage Reporting Each Source of Influence

Source	Source Influence Percentage			
	1978E	1979E	1978G	1979G
Colleagues	48.4%	40.3%	54.7%	43.9%
Scholarship availability	27.9	29.9	35.8	31.7
Meeting academic requirements	24.6	24.7	15.1	26.8
Other	15.6	22.1	17.0	19.5
Mailed notice	11.5	11.7	5.7	17.1
Newsletters	10.7	7.8	15.1	4.9
Administrative encouragement	5.7	9.1	5.7	4.9

Foremost was the influence of colleagues, not an unexpected finding. An influence hidden in the scholarship availability was that many of the scholarships were offered by groups especially interested in environmental education such as local garden clubs. It is not, then, monetary support that necessarily provided this strong influence, but the encouragement of a special interest group, perhaps perceived as a peer group quite distinct from colleagues. The availability of graduate credit for TES attendance was

a decided value, particularly for younger teachers with academic requirements to fulfill.

Use and Perceptions of Mass Media

The primary profiles of media use and perceptions are presented in Figure 1.

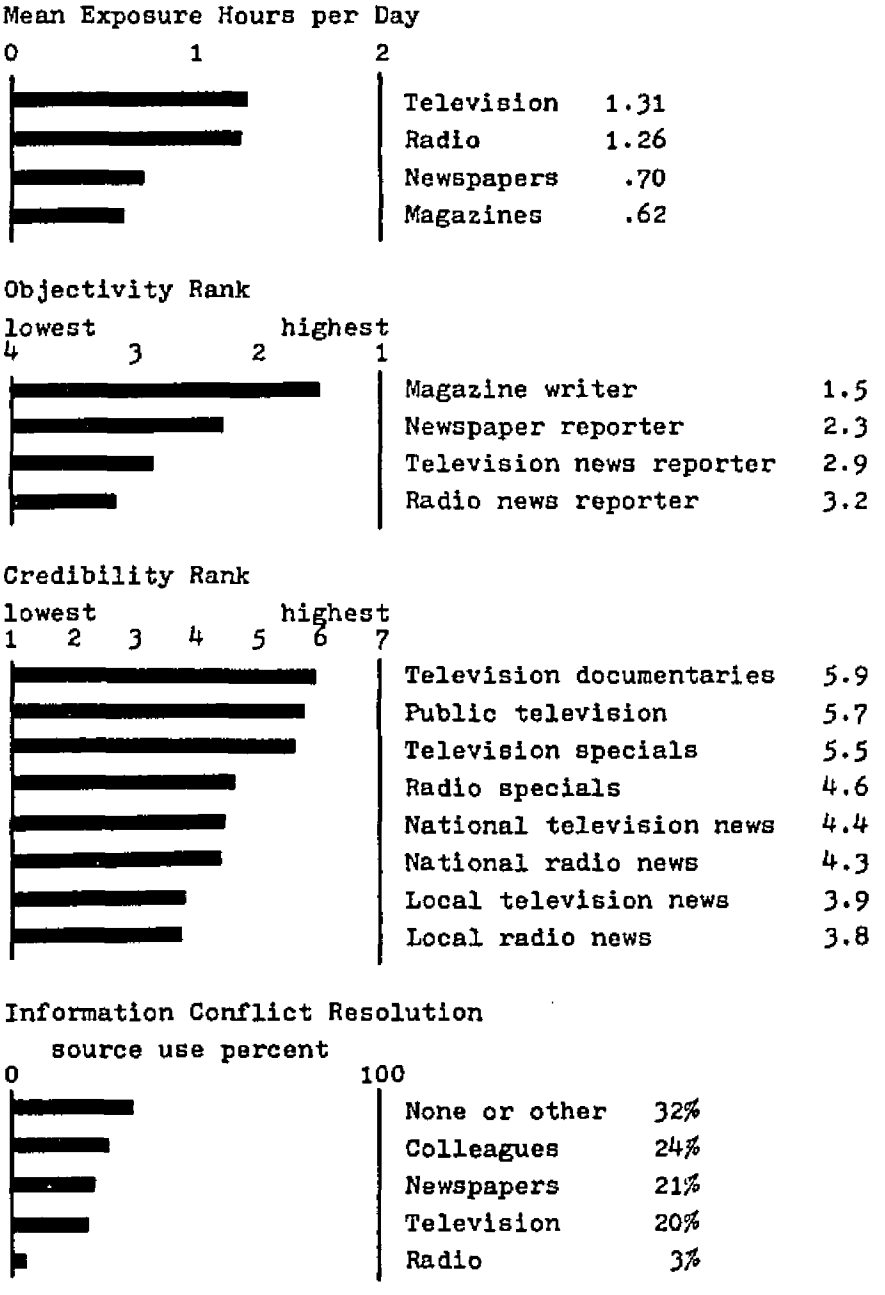

Figure 1. Information Source Profile

Media Exposure Quantities

The time per day spent with each of the four mass media listed shows some interesting distinctions. In Table 16, all respondents are summarized. The data in Table 17 exclude the extreme data points to eliminate those with extraordinary quantities, such as the radio listeners reporting more than half the day with the radio on and those not using media, in order that meaningful comparisons might be drawn.

TABLE 16

MEDIA USE, minutes per day

	1978E N=123	1979E N= 77	1978G N= 53	1979G N= 42
Television				
mean	93.05	63.55	78.46	85.46
sd	56.94	43.46	43.92	99.98
.95 C.I.	82.88-103.21	53.62-73.48	66.23-90.69	53.05-117.87
range	0-300	0-150	0-150	3-600
n	123	76	52	39
Radio				
mean	112.99	71.84	59.10	94.97
sd	138.36	50.34	45.09	146.90
.95 C.I.	88.19-137.79	60.34-83.34	46.28-71.92	47.36-142.59
range	0-840	0-240	0-150	0-900
n	122	76	50	39
Newspapers				
mean	47.85	40.07	41.76	42.85
sd	27.80	31.21	24.06	49.92
.95 C.I.	42.88-52.81	32.93-47.20	35.00-48.53	26.66-59.03
range	0-120	0-150	0-120	0-300
n	123	76	51	39
Magazines				
mean	42.48	42.83	32.26	34.37
sd	35.25	29.06	17.25	29.13
.95 C.I.	36.16-48.80	36.19-49.47	27.51-37.02	24.80-43.94
range	0-240	0-150	15-60	0-150
n	122	76	53	38

TABLE 17

MEDIA USE EXCLUDING EXTREMES, minutes per day

	1978E N=123	1979E N= 77	1978G N= 53	1979G N= 42
Television				
mean	92.76	62.40	78.46*	67.50
sd	57.55	42.57	43.92	38.03
.95 C.I.	82.08-103.44	52.60-72.20	66.23-90.69	54.63-80.37
range	0-300	0-150	0-150	3-150
n	114 (9)	75 (1)	52 (0)	36 (3)
Radio				
mean	87.74	71.20	59.10 *	67.92
sd	78.08	50.36	45.09	46.96
.95 C.I.	73.19-102.30	59.61-82.79	46.28-71.92	52.03-83.80
range	0-300	0-240	0-150	0-150
n	113 (9)	75 (1)	50 (0)	36 (3)
Newspapers				
mean	46.27	39.00	41.76	33.75
sd	26.56	30.00	24.06	19.10
.95 C.I.	41.34-51.20	32.10-45.90	35.00-48.53	27.29-40.21
range	0-120	0-150	0-120	0-60
n	114 (9)	75 (1)	51 (0)	36 (3)
Magazines				
mean	38.26	41.40	32.26	32.08*
sd	26.22	26.43	17.25	21.86
.95 C.I.	33.37-43.14	35.32-47.48	27.51-37.02	24.69-39.48
range	0-120	0-120	15-60	0-120
n	113 (9)	75 (1)	53 (0)	36 (2)

*significant (x) number excluded as extreme

Most apparent was the general decrease in media consumption between entry, mid-summer, and the follow-up reports, during the active school year. Print media use appeared to have achieved a minimal level of between one and one and one-half hours per day. Newspapers occupied slightly more than half of this time.

Combined electronic media had a measure of stability. Radio occupied a little more than an hour, its broader variations perhaps reflecting differences in commuting time. Combined print-media use time was about equal to television

use time for these media consumers.

While some of the differences between the populations reported here had statistical significances, the variability represented by the standard deviations and the eta^2 values is sufficient that inferences should not be extended to larger populations, as noted in Tables 18 and 19.

TABLE 18

MEDIA USE ANALYSIS OF VARIANCE, All Groups

Source	Mean	sd		df	MS	F	p	eta^2
Television	78.57	50.52	between within	3 273	15662.40 2407.97	6.504	.000	.067
Radio	75.38	62.93	between within	3 270	11279.99 3878.87	2.908	.035	.031
Newspapers	41.83	26.51	between within	3 272	1733.50 691.18	2.508	.059	.027
Magazines	37.16	24.42	between within	3 273	1227.47 589.27	2.083	.103	.022

TABLE 19

MEDIA USE ANALYSIS OF VARIANCE, Paired Groups

Source		Mean	sd		df	MS	F	p	eta^2
1978E to 1978G									
Television	E G	92.76 78.46	57.55 43.92	between within	1 164	7304.16 2881.90	2.534	.113	.015
Radio	E G	87.74 59.10	78.08 45.09	between within	1 161	28438.64 4859.84	5.852	.017	.035
Newspapers	E G	46.27 41.76	26.56 24.06	between within	1 163	715.83 666.45	1.074	.302	.006
Magazines	E G	38.26 32.26	26.22 17.25	between within	1 164	1295.57 563.86	2.298	.131	.014
1979E to 1979G									
Television	E G	62.40 67.50	42.57 38.03	between within	1 109	632.68 1694.89	0.373	.542	.003
Radio	E G	71.20 67.92	50.36 46.96	between within	1 109	262.22 2429.92	0.108	.743	.001
Newspapers	E G	39.00 33.75	30.00 19.10	between within	1 109	670.44 728.15	0.921	.339	.008
Magazines	E G	41.40 32.08	26.43 21.86	between within	1 109	2111.36 627.49	3.365	.069	.030

Information Sources Evaluation

Exposure quantities are revealing and have important influences, but reports of quantity should be tempered with user perceptions of quality. It is reasonable to assume that quality evaluations may have important influences on the receptivity of these teachers to media messages.

Objectivity Rank

In requesting objectivity ratings, the reporter was emphasized in an attempt to reduce the influence of visual materials and other aspects of visual form. The visual presence and dramatized style of the television reporter would still be operant, but changing the response system to a rank-ordering by objectivity perceptions was thought a reasonable effort to diminish their effects.

Straightforward rankings, shown in Table 20, were consistent among the four groups. Between entry and subsequent measurements, no changes in order were evident. The only differences of note were the tendencies in both mail-response groups to bring the electronic media reporters closer together, neither lower nor higher in net ranking.

The 1979 entry group differed from its 1978 counterpart in the extent of perceived difference between the television news reporter and the newspaper reporter, but the gap diminished subsequently. The 1978 after-group did endorse magazine writers more emphatically in spite of a 15 percent reduction in use time.

TABLE 20

MEDIA PERCEPTION,
OBJECTIVITY RANK AND RATING

	1978E N=123	1979E N= 77	1978G N= 53	1979G N= 42
Magazine writer				
mean	1.53	1.49	1.28	1.67
sd	.97	1.01	.77	1.20
.95 C.I.	1.35-1.72	1.25-1.74	1.05-1.51	1.26-2.07
n	116	69	47	36
Newspaper reporter				
mean	2.43	2.24	2.32	2.28
sd	.87	.69	.88	.88
.95 C.I.	2.26-2.59	2.06-2.41	2.05-2.59	1.97-2.58
n	115	68	44	36
TV News reporter				
mean	2.76	2.97	2.98	2.84
sd	.96	1.07	.80	1.14
.95 C.I.	2.58-2.95	2.70-3.24	2.73-3.23	2.43-3.26
n	115	67	43	32
Radio News reporter				
mean	3.25	3.24	3.31	2.97
sd	.86	.74	.84	.90
.95 C.I.	3.08-3.41	3.05-3.43	3.04-3.57	2.64-3.30
n	113	66	42	32

Ranks: 1=best, 4=poorest

Credibility Rating

Respondents were asked to indicate their perceptions of credibility of several subdivisions within the electronic mass media. The seven segment Likert-type scale was labelled Not Credible at one end and Very Credible at the other.

Two changes appeared in credibility ratings by the 1979 group, as shown in Table 21. Television documentaries improved their position, from second to first place, and perceptions of national news programs on both media improved.

TABLE 21

MEDIA PERCEPTION,
CREDIBILITY RANK AND RATING

	1978E N=123	1979E N= 77	1978G N= 53	1979G N= 42
Television documentary				
mean	5.96	5.74	5.77	6.08
sd	1.10	1.28	1.21	1.09
.95 C.I.	5.75-6.16	5.44-6.04	5.42-6.13	5.72-6.44
n	117	74	48	37
Public television				
mean	5.64	5.81	5.46	5.89
sd	1.33	1.28	1.50	1.30
.95 C.I.	5.38-5.89	5.51-6.11	5.02-5.90	5.44-6.33
n	111	73	48	36
Television specials				
mean	5.61	5.27	5.46	5.54
sd	1.17	1.32	1.29	1.48
.95 C.I.	5.39-5.83	4.96-5.59	5.08-5.84	5.04-6.04
n	115	73	48	37
Radio specials				
mean	4.68	4.50	4.42	4.76
sd	1.20	1.42	1.27	1.56
.95 C.I.	4.43-4.93	4.16-4.84	4.04-4.81	4.22-5.31
n	97	70	45	34
National television news				
mean	4.38	4.30	4.38	4.78
sd	1.27	1.46	1.28	1.20
.95 C.I.	4.14-4.62	3.96-4.65	4.00-4.75	4.37-5.19
n	115	73	48	36
National radio news				
mean	4.22	4.16	4.23	4.74
sd	1.19	1.33	1.13	1.40
.95 C.I.	3.99-4.45	3.84-4.47	3.90-4.57	4.24-5.23
n	109	71	47	34
Local television news				
mean	4.00	3.68	3.83	3.92
sd	1.18	1.19	1.14	1.20
.95 C.I.	3.78-4.22	3.40-3.97	3.50-4.17	3.50-4.33
n	114	73	48	36
Local radio news				
mean	3.90	3.65	3.60	4.12
sd	1.23	1.30	1.14	1.20
.95 C.I.	3.66-4.14	3.34-3.96	3.26-3.93	3.69-4.54
n	110	72	47	34

Rating: 1=Not credible, 7=Very credible

The ratings demonstrated a three-part distinction: local news coverage was firmly last with public television, documentaries and television specials well in front.

Reliability Rating

Perceptions of their colleagues' knowledge of environmental matters was tested against other information sources which would be readily or frequently available for questioning or reference. The terms up-to-date, accurate and thorough were used in the questionnaire and abbreviated to reliability for convenience in reporting.

Source ratings, Table 22, were divided by the respondents into three distinct categories. Special interest publications were ranked highest by all four groups. Professional sources--journals, classes and Extension Service bulletins--maintained their relative positions in a middle-range. General magazines, colleagues and newspapers were ranked closely in last place. The rankings tended to confirm the assumption that thoroughness of coverage was a strong value for these media users.

TABLE 22

MEDIA PERCEPTION,
RELIABILITY RANK AND RATING

	1978E N=123	1979E N= 77	1978G N= 53	1979G N= 42
Special interest publications				
mean	1.92	1.75	2.15	1.92
sd	1.20	1.09	1.09	1.28
.95 C.I.	1.69-2.14	1.49-2.02	1.82-2.47	1.49-2.35
n	118	69	48	37
Professional journals				
mean	2.55	2.49	2.24	2.91
sd	1.46	1.37	1.32	1.45
.95 C.I.	2.27-2.84	2.13-2.85	1.82-2.65	2.38-3.43
n	105	59	42	32
Cooperative Extension Service bulletins				
mean	2.64	2.83	2.84	3.06
sd	1.25	1.70	1.57	1.86
.95 C.I.	2.35-2.93	2.36-3.30	2.31-3.37	2.39-3.74
n	75	54	37	32
Formal classes				
mean	2.94	3.55	2.97	3.23
sd	1.50	1.48	1.54	1.59
.95 C.I.	2.63-3.26	3.16-3.94	2.46-3.49	2.64-3.81
n	91	58	37	31
General magazines				
mean	4.71	4.70	4.64	4.83
sd	1.73	1.53	1.59	1.74
.95 C.I.	4.33-5.09	4.26-5.14	4.02-5.26	4.10-5.57
n	83	50	28	24
Colleagues				
mean	4.68	5.21	5.37	5.21
sd	1.62	1.32	1.60	1.32
.95 C.I.	4.29-5.07	4.82-5.60	4.73-6.01	4.70-5.73
n	69	48	27	28
Newspapers				
mean	4.84	5.41	4.93	5.41
sd	1.60	1.52	1.80	1.68
.95 C.I.	4.47-5.20	4.98-5.84	4.22-5.63	4.77-6.06
n	79	51	28	29

Rating: 1=first choice, 7=last choice

Conflict Resolution

A question specifically intended to explore the relative perceived value of mass media and one source of interpersonal communication was posed. Two premises for the question were immediacy and ready availability. Each of the four sources, radio, television, newspapers, and colleagues, was assumed to be available on a daily or near-daily basis for "consultation."

TABLE 23

CONFLICT RESOLUTION SOURCES
Percentage Selecting Each Source

Source	All groups N=295	1978E N=123	1979E N= 77	1978G N= 53	1979G N= 42
None or other	32%	30.9%	27.3%	43.1%	31.7%
Colleagues	24	25.2	27.3	13.7	24.4
Newspapers	21	22.0	20.8	25.5	14.6
Television	20	20.3	22.1	11.8	26.8
Radio	3	1.6	2.6	5.9	2.4

From Table 23 it was apparent that initial rankings by the two entry groups were reasonably consistent. Increases in what might be called introspective resolution of conflict (none or other) may well have been an artifact of the mail survey response. The loss of supporters by the colleagues and television in the 1978 group may have been a related transfer. Several statistical procedures, parametric and nonparametric, were used in combination with the major variables in this study seeking sufficient correlations to explain the selection patterns. None were apparent.

Other interpersonal sources could have been included

in this item but it was assumed that, outside of the household members, colleagues would be the only interpersonal source available to all teachers any and every day, excepting weekends and holidays. Another assumption was that colleagues would be considered a knowledgeable peer group which could be used to help sort out conflicting information received from other sources. It is true, of course, that the colleagues themselves could generate the conflicting information.

Correlations of Media Use and Media Perceptions

Relationships between media use and ratings of objectivity and credibility were slight at best. The low values of Kendall's tau correlation coefficients when relating these aspects of the total population studied only suggested that television users tended to demean radio and that magazine users were inclined to look askance at all other media, without showing any particular strength of loyalty to magazine writers.

When the four groups were separated, as shown in Tables 24 and 25, relationships which appeared on entry tended to disappear later. Exceptions were the increases in ranking strength of newspaper reporter objectivity by 1978 newspaper readers and magazine writer objectivity by 1979 magazine readers.

Credibility perceptions by the groups showed different changes. Radio and newspaper users both tended to place somewhat more credence in television documentaries in the

fall, perhaps a fortuitous result of programming preceding survey responses. Magazine users in the 1978 group had apparently discovered the dearth of radio specials, and newspaper readers in this same group confirmed the low rating of national radio news.

TABLE 24

OBJECTIVITY RANK AND MEDIA USE
Rank Order Correlations (Kendall)*
Significant Correlations Only

Objectivity Rank	Medium			
	Television	Radio	Newspapers	Magazines
1 - Magazine writer				
1978E				
1979E	+ .178			
1978G		- .192		- .173
1979G				+ .233
2 - Newspaper reporter				
1978E			+ .194	
1979E	+ .158	- .194	- .155	
1978G	- .207		+ .226	
1979G				
3 - Television news reporter				
1978E			- .159	- .225
1979E				
1978G				
1979G				
4 - Radio reporter				
1978E		+ .181		
1979E	- .268	+ .192		+ .250
1978G				
1979G				

* coefficients with p not exceeding .05

TABLE 25

CREDIBILITY RATING AND MEDIA USE
Rank Order Correlations (Kendall)*
Significant Correlations Only

Credibility Rank	Medium			
	Television	Radio	Newspapers	Magazines
1 - Television documentary				
1978E				
1979E				
1978G			+ .168	
1979G		+ .208		
2 - Public television				
1978E				+ .150
1979E				
1978G				
1979G				
3 - Television specials				
1978E				
1979E				
1978G				
1979G				
4 - Radio specials				
1978E				
1979E	- .143		- .192	
1978G				- .185
1979G				
5 - National television news				
1978E	+ .191			
1979E				
1978G			+ .177	
1979G				
6 - National radio news				
1978E				
1979E	- .166		- .193	
1978G			+ .232	
1979G				
7 - Local television news				
1978E				
1979E		- .193		
1978G		- .175		
1979G				
8 - Local radio news				
1978E			+ .194	
1979E		- .249	+ .263	
1978G				
1979G				

* coefficients with p not exceeding .05

CHAPTER IV

DISCUSSION

The populations in this study were self-selected members of the teaching profession who indicated through their attendance at the Teachers' Environmental School interest in their biophysical surroundings, environmental education or both. The decision to attend was professionally based and influenced by a combination of factors. The leading influence was the School's reputation communicated by colleagues. This was supported by modest monetary assistance and the implied encouragement of a special interest group, as well as the availability of academic credit.

The dimensions of central interest were measured before and after the intensive environmental education experience to seek out changes in attitudes toward the environment, personal actions favoring environmental matters, perceptions of the scope of environmental education, professional behaviors in environmental education, and use of communication sources for information about environmental affairs.

The groups surveyed were intended to represent those teachers who committed their time resources to an environmental learning experience directed toward professional development. The design corresponds with the pre-experimental pretest-posttest of Campbell and Stanley (1963, p. 8) using two groups rather than one.

Environmental Attitudes

The attitude profile of the groups measured in this study, Figure 1 and Table 2, suggest limited effect over time of any attitude enhancement resulting from attendance at the Teachers' Environmental School.

Attitude Measure

Teachers in this study showed a strongly favorable attitude toward environmental affairs when questioned about specific action and issue attitudes. When no action attitudes were required and issues were not defined, the strength of attitude was even higher. Such findings agree with the expectations suggested from Weinstein's studies (1972) and Leftridge and James (1980), reflecting also the situational variability and antecedents of Schuman (1972) and Grunig and Stamm (1979) in taking compromise positions when both issue values and action values were combined in a single attitude statement.

Attitudes may be expected to change over time. There was little indication that teachers entering the TES underwent

expected changes. Part of this may have resulted from the favorable disposition on entry, with the experience serving to reinforce, not change attitudes.

George's comparable groups of 1964 and 1965 showed significant differences (at p=.01) but his data treatment included specific-knowledge questions excluded from this study. With the data available here, it appears that the change found by George was in the fund of information related to resources rather than in attitudes (cf. Burrus-Bammel, et al., 1980). Further, the demand-response items included in the attitude portion of the measure, 15 of the 32 items, served to inflate the scores and reduce the within-group variance. The result of including the additional items led to a finding of differences not supported in this study.

There is strong indication that the expected attitude change over time did not occur to a significant or important extent, or the attitudes returned quickly to near former levels. The populations were characterized by environmentally favorable attitudes on entry, 80 and 82 percent favorable response, so that changes would be expected to be relatively small. Items which did not factor-load influenced results toward a suggestion of significant change not supported by comparisons of the factors. Perhaps the favorable disposition toward environmental conservation evidenced by attendance at the Teachers' Environmental School had reached a practical plateau at the time of arrival.

Crisis View

The strongly expressed view that the environmental "crisis" is serious was expected. The findings supported the contention that a broadly stated question consonant with the predisposition would achieve a favorable response notably higher than a series of more narrowly defined questions.

Content Perception

The Michigan Department of Education stated that

> . . . environmental education is total and comprehensive in its scope; it is part of all subject areas and should be included at all grade levels . . . (Michigan Department of Education, 1973, pp. 4-5)

This survey indicated that teachers did not necessarily support the official stance, or had not heard it. Nor was their perception of content appropriate to environmental education especially different after an experience designed to expand their views. Indeed, their perceptions were remarkably stable. While an overall average of 18 percent reported that all subjects were included in their concept of environmental education (see Table 6), they did not exhibit this view in their professional practices. Perhaps the disparity and the lack of correlation between perceived scope and classroom practice was limited by the range and kinds of subjects taught.

Attitude Relationships

Analysis of variance comparing before and after scores from both the perceived content and the attitude

measure showed variation within the groups greater than variation between the groups for both 1978 and 1979 populations, with probabilities ranging from 0.24 to 0.74. Rank order correlations of these two dimensions revealed a greatest tau value of 0.27 ($p=.001$) for the 1979 group, hardly a promising relationship.

It was anticipated that those teachers reporting all or nearly all of the subject matter areas as appropriate to environmental education would also score high on the attitude measure. Statistical analysis did not support this assumption.

Personal Environmental Actions

The statements comprising the attitude measure used in this study were value-laden, often combining cognitive, affective and behavioral elements. Such a composite measure is usually an unreliable predictor of overt behavior (Weinstein, 1972). To determine if these populations, self-selected for interest in environmental matters, expressed their declared attitudes through environmentally supportive behaviors, action reports were acquired. The four categories of personal involvement reflected public and private actions in verbal and physical forms with and without direct social-system influence (Gross and Niman, 1975; Steininger and Voegtlin, 1976).

Public defense of their environmental views was not especially popular. There was, however, a general increase

in the attempts to influence governmental and non-governmental institutions regarding environmental matters.

Participation in publicly organized projects appeared to have achieved a measure of stability with about twenty percent non-participation. Active teachers tended to be involved in both cleanup campaigns and projects they perceived as contributing to environmental protection. It is likely that these two overlapped in conduct and in perceptions with variations in specific activity percentages dependent on opportunity and recognition of opportunity.

The quiet, partly anonymous actions of recycling, supported by legislation, received more than 80 percent endorsement. Social approval would have been widely evident with the passage at that time of the publicly initiated can and bottle return law. It appeared that these teachers were encouraged by public acknowledgement and policy but private actions without direct influence of the social system were not common.

Environmental Education Practices

About three-fourths of the teachers in this study conducted some form of environmental education in their school program, concentrating primarily on outdoor learning experiences. Whereas classroom time was reported as only nine to twelve minutes per day, the tendency of teachers to instruct in "units" may have concentrated the environmental "unit" into one class period per week. This may be effective

instruction, but it is not total and comprehensive and part of all subject areas as stated by the Michigan Department of Education.

Perhaps the lack of breadth in the school program was due to a perceived low level of competency and consequent avoidance. Attendance at the Teachers' Environmental School may have reflected a desire to improve that competency. The correlation between workshop attendance and classroom time tends to support this view, not necessarily in conflict with the views of Borden and Schettino (1979) since the correlation values suggest that workshops supported current teaching rather than being used as preparation for new teaching in the environmental education realm. There were no significant changes in professional practices in the school program.

Relationships with Perceived Content

The amount of time spent in environmental education in the classroom was expected to correlate with perceptions of the scope of environmental education. In fact, there was no correlation, before or after. Only one relationship of significance and value was uncovered. Analysis of variance showed the 1979 group with a relationship between content perception and tendency to conduct outdoor learning experiences, at $p=.05$, of $eta^2=0.56$ before and $eta^2=0.63$ after, probably an ordinary flux, in practices or in recall.

Relationships with Attitudes

Explorations of relationships between professional practices and attitudes revealed no correlations at p=.05, before or after, with the overall measure or either of the two principal factors.

Use and Perceptions of Mass Media

There has been considerable discrepancy in the views of environmental communication authorities previously cited toward the effects of mass media on environmental attitudes. In spite of abundant evidence that there is no relationship between environmental knowledge and environmental attitudes, there is underlying agreement that information is the basis for beliefs which lead to both attitudes and behaviors.

All four groups were moderately heavy consumers of all four media reporting an overall average of 3.89 hours per day. Summary inspection of objectivity and credibility rankings immediately suggested a preference for those presentations which explored a topic in depth. This thorough coverage and dedication to their special interests weighed heavily in evaluations of the media. (Cf. Greenberg and Roloff, 1974; Wilson and Howard, 1978.)

No special preferences were indicated for resolving conflicts in information received about environmental matters. These teachers apparently relied on knowledge already acquired or on less immediate and ubiquitous sources.

Conflicts which were encountered may have been ignored or judged irrelevant to themselves (Leftridge and James, 1980). Or perhaps only the information which reinforced existing attitudes and beliefs or served a self-centered special interest was selected for acquisition.

Relationships with Attitudes

Support for the contention that information is the basis for beliefs may be discovered in a correlation between intensity of magazine use and perception of environmental education content scope. Kendall's tau values of 0.138 ($p=.02$) for the 1979 group as a whole and 0.227 ($p=.01$) for the 1978G group suggested a meaningful relationship. However, it was at least as likely that those with a tendency toward a holistic view of environmental education were more avid consumers of the breadth and scope of coverage available in magazines. (Cf. Kippax and Murray, 1980; Palmgreen, et al., 1981.)

There is no evidence to support a relationship between use of any medium and the score on the attitude measurement instrument or either of its principal factors. Nor is there any apparent relationship of mass media use patterns with choices of media sources for resolving conflicts in information received. One is led to conclude that all sources report the same information or that all sources may be considered suspicious with the conflict becoming, in the end,

one between beliefs already held and input from external information sources.

Tests of Hypotheses

Statistical methods were applied in testing the hypotheses posed in Chapter II. The specific tests chosen were based on the nature of the data collected and the needs of the hypothesis statements. Additional statistics were used where they might add substance to the test statistic. In comparisons and tests of relationships, a critical value at 0.05 significance was chosen in order to maintain the power of the tests to reject false hypotheses yet avoid Type I errors.

Hypothesis 1. No significant differences were found in environmental attitudes before and after an intensive environmental education experience: Fail to Reject the Null Hypothesis. In addition, the data suggest that no significant differences would be found in re-analysis of the 1964 and 1965 groups based on the same population selection procedures and follow-up questioning; the 1965E and 1964G measurements fall between the scores of 1978 and 1979.

Hypothesis 2. No significant differences were found in perception of the scope of environmental education following an intensive environmental education experience: Fail to Reject the Null Hypothesis. This investigation also confirmed

a continuation of the traditional emphasis in environmental education on the biophysical subject areas.

Hypothesis 3. No significant differences were found in the overall tendency toward personal actions favorable to the environment: Fail to Reject the Null Hypothesis. Here, however, some shifts were found in details of activity, especially in conforming to a legislative mandate, so that a substantive judgment was necessarily applied in reaching the overall conclusion.

Hypothesis 4. With reservations, no significant differences were found in professional environmental education practices before and after an intensive environmental education experience: Fail to Reject the Null Hypothesis. The slight real decline in perceived time spent on environmental education in the classroom (not statistically significant) may have been a function of the curriculum structure. The significant decrease in out-of-school activity was nonetheless slight and may have been due to timing--fall has been traditionally less amenable to out-of-school environmental activity than spring. Frequency in out-of-school activity was significantly and meaningfully higher. These last two indicate fewer teachers doing more out of school. The hypothesis tests were tempered with logic to arrive at the conclusion of no significant change overall.

Hypothesis 5. The populations indicated no source preference from those made available by the instrument for resolution of conflicting information about environmental matters and there were no subsequent changes of statistical significance: Fail to Reject the Null Hypothesis. Departures for the "All Groups" pattern were sufficient to warrant additional study but were assumed here to be confounded by shifts of interpretation or other indirect caprice, a judgment substantiated by failure of choices to correlate with media use or media evaluation patterns.

Hypothesis 6. No significant differences were found in perceptions of environmental information quality of the mass media before and after the TES experience: Fail to Reject the Null Hypothesis. Additionally, no significant relationships were found between perceptions of quality and environmental attitudes expressed by the populations. This lack of significant relationships held when comparing the higher-use levels of the summer seasons and the lower-use levels of November with attitudes measured at the same time.

CHAPTER V

SUMMARY AND CONCLUSIONS

This study was developed to compare attitudes, actions and communication behaviors of selected groups of teachers before and after an intensive, residential, environmental education workshop experience. It was expected that some of the findings would link changes in these characteristics to the experience.

The population selected was to enter an environmental education experience designed to assist teachers in beginning or improving environmental education in their classrooms.

> The curriculum is . . . focused on providing teachers with an understanding of critical issues dealing with the relationship between man and his environment. Teaching techniques will be discussed by teachers who have put them into practice and special emphasis will be placed on relevant programs for the metropolitan areas where most of us live. (Teachers' Environmental School, 1978 and 1979, descriptive brochure.)

Two groups of teachers were measured by questionnaire on several dimensions at the beginning of the workshop experience, one in the summer of 1978 and the second in the summer of 1979. The same teachers were measured again, by mail in November 1979, using the same questionnaire.

This investigation was built on an entry profile of the 1978 group of teachers reported by Covert in 1980. A

second group was added, the 1979 population, to provide a broader base for analysis. With the second responses requested from both groups at the same time, two time intervals became available, approximately four months and sixteen months after departure from the TES.

Summary of Results

The results from this research indicated that there were no significant changes in environmental attitudes, environmentally favorable personal actions, perceptions of or practices in environmental education, or communication behaviors in either group.

In summarizing the first study, statements were made that a favorable attitude toward the environment did not necessarily indicate a likelihood of personal actions or classroom practices which would promote the environmental cause. The current study reinforces those conclusions.

Attitudes

Environmental attitudes were remarkably stable. Increases in average scores were between 2.0 and 2.3 percent, including those scores from similar groups in 1964 and 1965. The implication is that teachers entering the TES had reached an attitudinal plateau with little probability of change. This implication was reinforced by finding no changes in perceptions of the content of environmental education, another aspect of attitude, despite an avowed purpose of the School to expand teachers' perceptions of scope.

Personal Actions

Although there was no change of significance in the tendency to take environmentally favorable action and no correlation between attitudes and personal actions, one consistency stands out. When the attitude measure was expressed in percentages, the group scores clustered in the low 80s. Those actions which were overt and sanctioned by the local community also clustered as percentages in the low and middle 80s. While lacking statistical significance, there was clearly a substantive significance. Whatever the reasons for activity, the groups as a whole did take affirmative personal actions commensurate with their attitudes. On the personal level, reluctance to verbalize their views seems less important than willingness to take action.

Professional Perceptions

The pattern of conduct and the perceived scope of environmental education apparently change little over time. There is no basis for judgment as to the quality changes which may have occurred. This study confirms many others in finding a tendency to concentrate what is called environmental education into outdoor learning activities or into unitized environmental studies in the classroom. The holistic approach appeared to be little more than theoretical.

Confining learning activities to biology and nature study is perhaps safer for teachers from two standpoints. It is factual knowledge, readily demonstrable or inferred,

and supported by textbook information generally considered not controversial. And, nature study is unlikely to conflict with either personal or community value systems.

Information Sources

The teachers in this study exhibited an expected selectivity in attention and perception by indicating special preference for those mass media offerings which presented information in depth and which were directed at their special interests. They also appeared to rely more on existing, stable or internal sources for the resolution of conflicts in information received than on those sources reflecting the daily flow of information. (Kippax and Murray, 1980.)

Recommendations

The information developed in this study suggests that the Teachers' Environmental School has functioned to reinforce or stabilize existing value systems and practices. However, the school offers an important opportunity to expand the effectiveness of environmental education programs directed specifically at teachers and prospective teachers.

Those teachers who committed themselves to an intensive, week-long experience in environmental education indicated a substantial predisposition, 80-plus percent, to take environmentally favorable personal action when there was opportunity to do so. Three-fourths of them conducted outdoor learning and half involved their students in

out-of-school environmental activities. There is, then, reason to believe that an important number of these teachers would take advantage of additional or redirected opportunity to take action.

These findings and implications, together with the conclusions of Cummings (1976) and Bozardt (1975,1976), lead to recommending that the Teachers' Environmental School modify its approach to the teaching of teachers. Specifically, the TES would serve well as a training experience for teachers who would then conduct in-service workshops for teachers in their own schools and school districts. Promotion and organization of such workshops could be effectively supervised by the TES as an entity or by the universities which conduct its programs.

There is considerable evidence that classroom teachers readily use relevant, thoroughly prepared, pre-packaged materials when they have learned how to use them. In-service workshops conducted by TES graduates could not only provide this direct assistance in the use of existing materials but offer methods for integrating environmental education into other areas of the curriculum, particularly the social sciences, perhaps generating new materials. (DuShane, 1974; Ritz, 1977; McCaw, 1979/80.)

Implications for Future Research

Teachers and their student audiences seem to accept environmental education when it is based on biophysical

systems, especially when outdoor learning experiences are involved. The goals expressed by environmental educators are, however, much broader (Johnson, 1977; Hungerford, et al., 1980). The reasons for these differences between stated goals and classroom practices need intensive study if the discrepancies between theory and practice are to be overcome.

Further, with an abundance of goals statements, there is little work which effectively translates these goals into practical classroom action other than in the biophysical sciences. It would be especially useful to develop methods for converting theory into practices which classroom teachers could and would apply. (Hepburn and Keach, 1974.)

Another question deserving study is the extent to which these or similar teachers reflect the attitudes and personal actions of teachers in general. And, do they to any degree reflect through specific factors or relevance or resource commitment the general citizenry of the communities from which they come.

Beyond the school setting, research needs to be focused on interactive systems of teachers, students and parents. Extension of the studies of Foerstel (1976) and McTeer (1978) might find why there is so little congruence when comparing environmental problem perceptions of intimately related groups.

APPENDICES

APPENDIX A

APPENDIX A

THE TEACHERS' ENVIRONMENTAL SCHOOL

The "Teachers' Environmental School was born of the need for better understanding of the relationship between man and his environment in these dynamic times." (TES, 1979) Each session was based on the same theme, although each had its own emphasis as indicated in the titles and course descriptions. Pertinent excerpts from the descriptions indicate consistency in primary emphasis.

> Michigan State University: Basic Environmental Conservation Concepts -- Exploring basic concepts to meet goals and objectives of environmental education.
>
> Eastern Michigan University: Workshop in Conservation -- The focus is on the concept of this Spaceship Earth as an ecosystem and on the impact of man and his technology on the delicate balance of the system.
>
> Wayne State University: Understanding Our Environment -- Emphasis will be placed on field studies of the interrelationships of living organisms and their environment. . . . an opportunity to improve your understanding and attitudes about the environment and people.
>
> Central Michigan University: Environmental Education -- Tools, Techniques and Philosophy -- Encourages the "hands-on" "real experience" method of teaching. Instructor will advocate the broad view of environmental education applicable to teachers in and out of the natural sciences.

Enrollees at each workshop could expect to learn concepts and details useful in their professional practice

of environmental education.

The Teachers' Environmental School (TES) is conducted at the Ralph A. MacMullan Conference Center operated by the Department of Natural Resources of the State of Michigan. The center is located in a vacation resort area of Michigan's northern lower peninsula. The setting is especially appropriate for a residential program devoted to environmental conservation education.

The staff of each workshop session was composed of university faculty members, sometimes supplemented by graduate assistants, from the sponsoring university. Graduate and undergraduate credits were offered for each session and were interchangeable and transferable among the several participating universities. The university faculty staffs were augmented and supported by an environmental specialist from the Michigan Department of Natural Resources.

Each TES session began with registration late Sunday afternoon and concluded at noon the following Friday. Sunday evenings were used to acquaint the students with the facilities, the living procedures, the faculty members, the nature of the week's program, and with each other. Instructional programs began early Monday mornings.

These populations were selected for study because they were made up of self-selected representatives of the teaching profession who indicated through attendance interest in their biophysical surroundings, environmental education or both. Intensity of this interest and individual motivations

for attendance were not determined and may have affected other characteristics measured on an individual-variation basis.

Some of the reasons for attendance may have been other than educational. Among these may have been social opportunities, a "painless" way to earn academic credits, an inexpensive vacation week in an outdoor setting combining other amenities with learning opportunities, and a general interest in nature and natural history with intensive "guided tours" available. Post-data-collection interviews by the researcher indicated that the principal reason for attendance was educational, with non-educational purposes secondary. This was in keeping with the 1977 report by Born and Clark indicating that teachers enrolled in environmental education workshops primarily "to learn how to environmentalize their teaching" and to receive college credit. It is reasonable to assume that teachers attending the TES represent teachers with a higher than average interest in the subject areas encompassed by environmental education.

The principal faculty member for each TES session was highly cooperative and encouraged the full cooperation of the respondents without further influencing their responses beyond that which would be expected from the setting.

Data Collection Procedures

Dr. Robert W. George, principal faculty member of the TES sessions conducted by Michigan State University, arranged

with the faculties of the other TES sessions in both 1978 and 1979 to allow data collection at the beginning of each of the sessions.

The questionnaire was administered at the conclusion of the Sunday meeting. The researcher was present during the registration and the Sunday evening overview as a non-participating observer to evaluate the activities, subjectively judging the potential for contamination of responses. The activities were judged as enhancing the receptivity of those attending with minimal likelihood of direct contamination.

Immediately preceding the administration of the questionnaire, the researcher was introduced by the principal faculty member of the session as a graduate student from Michigan State University conducting a research project. The faculty member encouraged the audience to cooperate and offered no other guidance. The researcher briefly introduced, then distributed the questionnaire. Respondents left the room as they completed the questionnaires and handed them to the researcher. The time for completion ranged from 12 to 30 minutes.

The groups of teachers were a "captive audience" for the study. The fact of their attendance in an academically-related program assured a high return of the questionnaire and encouraged thoroughness in its completion. The captive situation might have been conducive to unwanted bias in responses, but analysis of the data collected indicated that it was minimal in its overall effects with little reduction

in the usefulness of the findings. This claim was supported by the Personal Action data and the self-report of time spent in environmental education. Responses to the subsequently distributed mail survey reinforced this premise.

The questionnaire was mailed to all of those persons listed on the attendance rosters for each of the sessions previously measured. First class stamps were used for both the outer envelopes and the enclosed return envelopes. The time for mail distribution was chosen so as to fall well within the school year but before the Thanksgiving holiday. By this time, the classroom and personal activities should have established whatever normal routine would be achieved. The response from the 1978 group was 46 percent and from the 1979 group, 53 percent.

A follow-up mailing was not conducted. Middle or late winter would offer a response environment markedly different from that of the first returns. It was assumed that those responding to the first wave questionnaire would represent the most interested teachers, intensifying any differences between before and after measurements.

Demographic Description of the Populations Studied

The total population attending the sessions in this study was reduced on a single dimension, vocation; all of those not perceiving themselves as teachers were excluded. Some of the respondents perceiving themselves as teachers were not currently active in the classroom. However, as

elementary school principals, curriculum coordinators, and administrators in small school districts, they were perceived by the researcher as having direct influence on environmental education in the schools and appropriate to be included. Post-high school instructors, such as college professors, and those involved in extended education programs were considered to have indirect rather than direct influence on environmental education in K-12 schools and so were not included as teachers in this study.

The resulting populations reported in this study are described in Table A1. The total of participants may be typified as young, probably without children at home, and tending to have achieved college degrees beyond the bachelor's. They have lived most of their lives in urban or semi-urban locales with well-established residences in their current communities. Not especially active in civic groups, at least on a formal basis, they are likely to be members of two or more professional organizations. Teaching assignments, past and present, tend to concentrate in the upper elementary grades although there is substantial representation from all grade levels, kindergarten through twelfth.

TABLE A1

DEMOGRAPHIC DESCRIPTION OF THE POPULATIONS

Item	Population Percentage			
	1978E	1979E	1978G	1979G
Age	(n=123)	(n= 74)	(n= 53)	(n= 42)
19-34	54.1	66.2	50.9	54.8
35-49	38.5	23.0	39.6	33.3
50-64	7.4	8.1	7.5	9.5
Children in Household	(n=121)	(n= 75)	(n= 52)	(n= 39)
No	52.9	57.3	50.0	61.5
Yes	47.1	42.7	50.0	38.5
Education Completed	(n=121)	(n= 73)	(n= 52)	(n= 40)
Bachelor's	60.3	51.3	44.2	50.0
Master's	38.8	44.7	51.9	50.0
Ph.D.	.8			
Youth Life Community	(n=121)	(n= 74)	(n= 53)	(n= 42)
City	33.9	36.4	41.5	33.4
Suburb	19.0	23.4	17.0	28.6
Small town	27.3	22.1	20.8	28.6
Country	19.8	14.3	20.8	7.1
Adult Life Community	(n=121)	(n= 72)	(n= 51)	(n= 41)
City	28.9	23.4	35.3	22.0
Suburb	22.3	37.7	31.4	29.3
Small town	28.9	15.6	19.6	29.3
Country	19.0	16.9	11.8	14.6
Resident Present Community	(n=122)	(n= 76)	(n= 53)	(n= 42)
0-5 years	23.8	38.2	28.3	31.0
5-10 years	24.6	17.1	28.3	31.0
more than 10 years	51.6	44.7	41.5	35.7
Civic Group Memberships	(n=123)	(n= 77)	(n= 53)	(n= 41)
0	54.5	54.5	54.7	43.9
1	21.1	22.1	30.2	26.8
2	15.4	10.4	9.4	17.1
3	2.4	7.8	1.9	7.3
more than 3	6.5	5.2	3.8	4.9
Professional Organizations	(n=123)	(n= 77)	(n= 52)	(n= 41)
0	4.9	9.1	7.7	14.6
1	28.5	27.3	30.8	22.0
2	33.3	31.2	34.6	31.7
3	22.0	18.2	13.5	22.0
more than 3	11.4	14.3	13.5	9.8
Grades Presently Taught	(n=119)	(n= 75)	(n= 49)	(n= 39)
K-3	23.5	14.7	18.4	15.4
4-6	36.1	32.0	34.7	28.2
Jr. High School	12.6	22.7	12.2	25.6
High School	17.6	18.7	18.4	23.1
Special Assignments	10.1	12.0	12.2	7.7
Grades Previously Taught	(n= 53)	(n= 75)	(n= 49)	(n= 39)
K-3	20.8	16.0	14.3	15.4
4-6	39.6	25.3	42.9	28.2
Jr. High School	15.1	18.7	12.2	20.5
High School	17.0	24.0	16.3	23.1

APPENDIX B

APPENDIX B

ENVIRONMENTAL ATTITUDE PROFILE

Questionnaire Number

1. Environmental Education has been defined by different people in different ways. Please express YOUR opinion by indicating which of the topics below you consider an important part of environmental education. Put a check mark in front of your selections.

___agriculture	___history
___animal husbandry	___language
___art	___mathematics
___biology	___music
___botany	___nature study
___business	___nutrition
___chemistry	___outdoor education
___conservation	___physical education
___ecology	___physics
___economics	___political science
___family management	___psychology
___geography	___sociology
___geology	___vocational education
___health science	___zoology

2. Which do YOU think does the best job of <u>objective</u> reporting about environmental issues? Mark number 1 for the best through number 4 for the poorest job.

___ magazine writer	___ radio news reporter
___ newspaper reporter	___ TV news reporter

3. What influenced you the <u>most</u> to attend the Teachers' Environmental School?

___ discussion with colleagues
___ newsletter notes
___ administrative encouragement
___ scholarship availability
___ mailed notices
___ meeting academic requirements
___ other _____

4. How long before you attended did you know about the Teachers' Environmental School? _____

5. About how long before you attended did you decide you would like to attend? _____

2

For each of the following statements, encircle the letter or letters which most closely represents YOUR idea concerning that statement. If, for example, you cannot Strongly Agree with a statement, then ask yourself if you can Agree, or you may choose to Disagree or Strongly Disagree. Do not respond as you think you should, but instead according to how you feel personally.

SA = Strongly Agree
A = Agree
U = Undecided
D = Disagree
SD = Strongly Disagree

SA A U D SD 6. Progress in our country will be slowed if we use effective environmental protection measures.

SA A U D SD 7. Conservation seems foolish when our standard of living is constantly rising.

SA A U D SD 8. Science will be able to find a substitute for natural resources when the original supply is exhausted.

SA A U D SD 9. The public schools of our nation do not spend enough time in environmental education.

SA A U D SD 10. Conservation of natural resources is so slow in its results that in a lifetime it can hardly benefit a person now alive.

SA A U D SD 11. Environmental education should be a very important area in the teaching of biology.

SA A U D SD 12. I consider environmental education to be a minor area in the education of the average citizen for everyday living.

SA A U D SD 13. Effective environmental protection practices endanger the personal liberty of a person.

SA A U D SD 14. Private business interests are responsible for many poor environmental practices.

SA A U D SD 15. The waste of our resources is an illustration of extreme selfishness and lack of consideration.

SA A U D SD 16. The subject of environmental education just doesn't interest me.

SA A U D SD 17. Environmentalists are too cautious and stand in the way of progress.

SA A U D SD 18. Environmentalists in general are alarmists.

SA A U D SD 19. Environmental education is important but you can't change human nature.

SA A U D SD 20. Poor environmental practices can weaken our position as a world power.

SA A U D SD 21. Conservation of our forests is not necessary as we already have substitutes for wood.

SA A U D SD 22. I am only concerned with our present standard of living. Future generations will be able to take care of their own.

SA A U D SD 23. There is little I can do regarding the environment; I am only one person.

SA A U D SD 24. Some businesses are against environmental protection measures because they feel the measures will restrict their activities.

SA A U D SD 25. When natural resources are used up in one area we can always move on to other areas.

SA A U D SD 26. If as students we take part in environmental conservation, it will have little value for us as we will not see the results of our labor while we are students.

SA A U D SD 27. I would rather engage in social activities than spend some of my own time furthering the cause of the environment.

SA A U D SD 28. If a person is not interested in environmental issues, he should not have to spend time learning about them.

SA A U D SD 29. Since our forefathers did not practice environmental protection, I see no reason why we should.

SA A U D SD 30. The great enemy of the environment is indifference on the part of the people.

SA A U D SD 31. I feel that if we do not take effective environmental protection measures in our country, we may eventually decline as a major power.

SA A U D SD 32. To practice environmental protection within the home is too time consuming.

SA A U D SD 33. The study of environmental education in the field is generally more effective than studying it in the classroom.

SA A U D SD 34. Prevention of waste within the home falls in the area of environmental protection.

SA A U D SD 35. Willful waste is a crime against humanity.

SA A U D SD 36. Human nature is such that we can never educate people to save for tomorrow.

SA A U D SD 37. We are an extremely wasteful nation.

4

38. Please rate the following popular mass media for their credibility ONLY when they are relating information about the environment. Place an X in a space from Not Credible to Very Credible which represents your opinion.

	Not Credible	Very Credible
National TV News		
Local TV News		
TV Specials		
TV Documentaries		
Public Television		
National Radio News		
Local Radio News		
Radio Specials		

39. About how much time per day do you spend:

	15 mins.	30 mins.	1 hour	1½ hours	2 hours	more than 2 hours
watching television	____	____	____	____	____	____
listening to radio	____	____	____	____	____	____
reading newspapers	____	____	____	____	____	____
reading magazines	____	____	____	____	____	____

40. Do your regularly recycle any of the following materials? Check if yes.

___paper ___bottles ___cans or metal goods

41. Have you personally taken part in any of the following? Check if 'yes'

___clean-up campaign

___beautification project

___environmental protection project

42. Have you ever done any of the following? Check if 'yes'.

___attended city or town commission or council meetings regarding an environmental problem

___written a letter to influence environmental legislation

___written or called a company or organization urging attention to violation of good ecological practices on their part

43. Did you feel that your actions affected the outcome?

___yes ___maybe ___no -- commission or council meeting

___yes ___maybe ___no -- environmental legislation

___yes ___maybe ___no -- company or organization violation

5

44. If you were seeking the most up-to-date, accurate and thorough environmental information, how would you rank the following sources? Indicate 1 for 1st choice, 2 for 2nd choice, and so on. You need not mark them all.

___general magazines (such as Time, Psychology Today, Women's Day)

___professional journals

___newspapers

___formal education classes

___colleagues

___Cooperative Extension Service bulletins

___special interest periodicals (such as Audubon, National Wildlife, etc.)

45. When you hear or read conflicting information about environmental matters, which one of the following are you most likely to believe? (Choose only one or none.)

___radio ___newspaper

___colleagues ___television

If you are presently a teacher, please continue to answer all questions. If you are not a teacher, please skip to question number 54, next page.

46. What grade or subject do you presently teach?_____

47. What other grades or subjects have you taught recently, if any?

_____

48. Do you conduct outdoor environmental learning experiences for your classes? ___yes ___no

49. If you answered yes to question 48, on what kinds of sites do you conduct these experiences? (Mark all that apply.)

___urban ___rural ___parks ___school sites ___natural areas

50. Have you involved your students in an out-of-school environmental education or environmental problem-solving activity in the last year?

___yes ___no

If yes, how many times? _____

51. About how much time do you spend, on the average, each day or each week on environmental education?

_____minutes per day OR _____minutes per week

52. How much time would you estimate the AVERAGE teacher in YOUR SCHOOL spends on environmental education?

_____minutes per day OR _____minutes per week

53. What would you estimate is the average amount of total classroom contact time for teachers in your school?

_____hours per day OR _____hours per week

6

54. Are you a member of the MEEA? ___yes ___no

55. To how many civic groups do you belong?

___0 ___1 ___2 ___3 ___more than 3

56. To how many professional organizations do you belong?

___0 ___1 ___2 ___3 ___more than 3

57. Ecology and environment have become household words in recent years. How do YOU view the "environmental crisis" we hear so much about?

___NOT a problem

___SLIGHT problem

___MODERATE problem

___SERIOUS problem

58. Do your friends share your view?

___yes ___some of them ___no

59. Do family members share your view?

___yes ___some of them ___no

60. Have you ever defended your position publicly?

___yes ___no

61. Have you attended any other seminars or workshops on environmental education in the last year?

___yes ___no If yes, about how many?____

62. How long have you lived in your present community?

___0-5 years ___5-10 years ___more than 10 years

63. Have you lived the greater part of your ADULT life in:

___city ___suburb ___small town ___country

64. Did you live the greater part of your life as a CHILD or YOUTH in:

___city ___suburb ___small town ___country

65. What is your vocation?_____

66. What is your age group?

___under 19 ___19-34 ___35-49 ___50-64 ___65 or above

67. Are there children in your household? ___yes ___no

68. What educational level have you completed?

___High School ___Bachelor's ___Ph.D.

___Associate Degree ___Master's

Thank you for your participation.

Douglas C. Covert
Environmental Communication
Michigan State University

5 November 1979

Please accept this additional opportunity to participate in the development of a new Environmental Attitude Profile in Michigan. The purpose of this survey is to analyze current opinions of those who have attended the Teachers' Environmental School at Higgins Lake. Your opinions will be held in the strictest confidence. It will take about 15 to 25 minutes to respond to all questions.

This survey is <u>not</u> a measurement of what you know. It is <u>not</u> an evaluation of what you do. We want to know how you really feel about environmental information. For instance, if you believe that basic human nature stands in the way of effective environmental education, please tell us. We are interested in your personal thinking about environmental matters and environmental education.

Please return the completed questionnaire in the envelope provided, no later than November 20, to:

Douglas C. Covert
Environmental Communication
Fisheries and Wildlife Dept.
Room 9, Natural Resources Bldg.
Michigan State University
East Lansing, MI 48824

Thank you for your assistance.

Douglas C. Covert

APPENDIX C

APPENDIX C

THE GEORGE ATTITUDE MEASURE

The Attitude Measure used in this study was taken from the George study administered in 1965 (George, 1966). In his research, George reviewed the prior work on which his study was based. Because the George measurement instrument is a central element of this study, a review of its development is included here in some detail.

Referring to Quaintance in 1940, George pointed out "the importance of attitudes and the social implications involved in effective conservation education. He cited 'testing for attitudes' as needed research. Sherman's multiple choice questionnaire of 1950 surveyed opinions and attitudes as well as knowledge possessed by elementary school teachers-in-training. The population resembled that of Peyton in 1976. Sherman's work was cited by George as "one of the first studies directed to the effect of the 'teacher factor' upon student knowledge" in this area.

Masters (1953) studied "teacher improvement in conservation education as a result of attending a conservation summer camp" in Illinois. This conservation education experience was similar to that of the Michigan program called

the Teachers' Environmental School.

George concluded that these earlier studies were not applicable to his work although they did tentatively explore conservation attitudes.

One of the early investigations which supported the need for the dual nature of the current study was that of Capps in 1939. He recognized that future studies of conservation education should include the effects of mass media specifying newspapers, magazines, radio and movies.

The first work which made a substantial contribution to the George study was that of Wievel in 1947. Wievel constructed a new, Likert-scale type, attitude measure when he was unable to find a suitable pre-existing one.

The Lively and Preiss investigation, published in 1957, explored the attitudes of conservation teachers and the programs of larger colleges and universities, pointing to the influence of attitudes on teaching of conservation. Several of the Lively and Preiss conclusions, valid at the time, no longer fit the published attitudes, concepts or practices of professional environmental educators, yet many others are as valid now as they were in 1957. The discrepancies are, in some instances, an outgrowth of the change from the conservation concept and its wise-use principles to the more comprehensive environmental concept which encompasses preservationist attitudes and compromises with economics, sociology and politics. Recognition of this disparity helped prompt the wording changes from "conservation" in the George study to

"environment" in the current study and its data collection instrument.

George traced the literature on conservation attitudes and their measurement, drawing on the work and summary by Remmers (1954). The work of Laug (1960) was then cited as "a ground-breaking project in conservation attitudes." Although Laug's project dealt with college freshmen and sophomores in a biology class, it did establish a usable attitude measure and that changes in attitudes occurred as a result of conservation training. Laug reported confirming the validity and reliability of his measuring instrument using statistical procedures.

The 1965investigation by Whiteman was a near-replication of the Laug study using a similar population. Whiteman refined the Laug test to accommodate computer analysis. Whiteman's work did much to establish the Laug instrument and the Likert-scale response format as a sound procedure for measuring and analyzing conservation attitudes and attitude changes. George noted that in spite of this sound work, "there is, however, a need to reach more varied age groups and educational levels," which he proceeded to do.

George pointed out (p. 33) some of the problems inherent in combining attitude and knowledge questions in the same measuring device. He thoroughly explored the previous test instruments, revising the testing tool to make it "adaptable to a wider range of ages and educational backgrounds" (p.34). As he was teaching college classes in

environmental conservation education, he was able to incorporate input from his students to further develop, refine and verify the previous questionnaires, benefitting both directly and indirectly his students and the students of other environmental educators.

One of George's considerations in instrument modification was to "intensify the statement or concept." There would be little problem, then, with immanent ambiguity of the statements and identification of attitude could be more clearly made by the respondents, both results desirable. Intensifying also reduced tendency to dissonance prompted by the statements. This intensification not only clarified and "eased interpretation" but affected the score distribution, resulting in a tendency to cluster scores in the upper portion of the range.

The clustering caused by intensifying the statements did make it more difficult to evaluate the scores of both individuals and groups. Changes in attitude scores may have appeared as small values when in fact the changes were fairly important, requiring rather large populations, sample or total, for statistical procedures to determine a statistically significant change. Differences within groups may also have appeared as disproportionately large when evaluating between-group differences. Reliance on statistical evaluation needed to be tempered by intuitive as well as deductive interpretation of the data collected.

George's effort to measure varied age groups and

educational levels was successful in itself and in establishing the soundness of his test instrument. He measured high school students, as had Wievel, college students, as had Laug and Whiteman, and adults. He used before-and-after and control testing to measure the effects of conservation education programs. The high school group experienced a 4-H conservation camp, the college group experienced a conservation oriented college course, and the adults experienced a summer conservation workshop for teachers and leaders which was the then-current equivalent of the Teachers' Environmental School.

As a result, George's preliminary study determined that his questionnaire was compatible with his needs and the prior work of Laug and Whiteman. He also determined that his questionnaire was valid for assessing changes resulting from the experiences each group underwent, supporting it with the statement that "the consistent correlation between experience and total scores as well as part scores reflected the validity of the measuring device" (p. 113).

The George questionnaire contained 64 items organized into four parts, the middle two parts relating to specific information about resources. For the current study, only the first and last parts were used in order to reduce need for factual knowledge on the part of the respondents. One major change was made in the George questionnaire content. The word "environment" was frequently substituted for the word "conservation." In the period intervening between the 1965

George study and that in 1978 and 1979, the word environment had become the all-encompassing term for human surroundings and also, when modified by such words as protection and impact, for the interaction of humans with their surroundings (Bozardt, 1976). The interaction role was formerly filled by the word conservation.

In state-level curriculum considerations for Michigan schools, conservation education had been relegated to a position secondary to and indeed only a part of environmental education. Conservationists had become environmentalists in many institutional proceedings. Conservation had gradually come to refer to use of resources within the overall considerations of "the environment." The substitution of words, where appropriate, was an effort to keep up with changes in the living language and an effort to avoid narrow interpretation of statements where a broader interpretation was desired.

Full agreement responses to each item of the attitude measure are indicated on the sample questionnaire in Appendix B. Inspection of individual questionnaires revealed that the Low and Very Low responses were well scattered among respondents and did not consistently emanate from the same individuals.

As the Attitude Measure contained a total of 32 statements and each response had a maximum score of four points, the total possible score was 128. The midpoint, the Undecided response, chosen throughout would total 64.

Groups responding to the George study were included in this investigation to a limited extent for the insight they might provide, and for further time-level comparisons. The 1965 group was described as "teachers and leaders who had not had the conservation workshop experience." This group, upon entry to the workshop, would be directly comparable to the 1978 and 1979 workshop entry groups.

Participants from the preceding year's workshop (1964) were asked "to choose a person in their area of interest who had never attended the workshop." This group offered George a control group for his comparisons. Although the no-workshop teachers had not self-selected for interest nor committed themselves to workshop attendance, it was reasonable to assume that those completing the questionnaire and returning it would be likely candidates for subsequent workshop attendance. This assumption was supported by data which indicated that colleague influence was the dominant factor in TES attendance.

The participants of the 1964 workshop were mailed questionnaires with the returns constituting the "graduates" group. A similar procedure was followed for the current study. The 1964 response rate was 46 percent, the 1978 response rate was also 46 percent, and the 1979 response rate was 53 percent. The no-workshop but workshop-graduate-selected persons responded at 41 percent.

APPENDIX D

APPENDIX D

TESTING THE ATTITUDE MEASURE

Responses of the entry groups (1978E and 1979E) were examined, as a whole and as two separate groups, for validity, reliability, normality, and homoscedasticity.

The Kolmogorov-Smirnov one-sample test for goodness of fit indicated no basis for rejecting the assumption of normal distribution of the groups. A conservative test when parameters of the test distribution are estimated from the sample, the K-S Z statistic for the combined groups was 0.661, p=0.775; the 1978E group showed a K-S Z value of 0.784, p=0.570; and the 1979E group had a K-S Z of 0.863, p=0.446. Homogeneity of variance also remained a reasonable assumption.

TABLE D1

HOMOGENEITY OF VARIANCE TEST

	Combined Entry Groups	1978E	1979E
Between measures ANOVA F	29.137	19.735	10.860
Hotelling's T-squared F	31.375	17.939	13.074

With neither normal distribution nor homoscedasticity rejected, the more powerful parametric tests were applied

subsequently, where appropriate, in preference to nonparametric comparisons.

Internal structure of the attitude measuring instrument was examined through factor analysis. Combining the two entry groups, ten factors with an eigenvalue equal to or greater than one appeared. When plotted, the scree test (Cattell, 1966; Rummel, 1970) suggested two or three principal factors and a slope discontinuity indicated a maximum of five (Rummel, 1970). Successive limitations on the number of factors permitted in the analysis confirmed one major and two secondary factors, the latter content-related.

For selection of the most heavily loaded items shown in the rotated correlational analyses, an arbitrary cutoff was used where inclusion depended on a factor correlation value at least twice its nearest competitor (Trotter, 1982; Cozby, 1982). Correlation and variance testing with successive iterations of all items confirmed the final selection.

Reliability of the attitude measuring instrument was estimated using coefficient alpha (Cronbach). The 32 item measure exhibited a consistently high alpha value for entry respondents as a single group or when divided into their years of entry.

TABLE D2

RELIABILITY COEFFICIENTS, ALL ITEMS

	Group		
	All	1978E	1979E
Alpha	0.849	0.848	0.849
Standardized item alpha (32 items)	0.875	0.870	0.885

Comparison of alpha values for the factors showed a decline from the value for the entire measure. As the second and third factors contained only five and three items, respectively, and appeared to have closely related content, they were combined so as to have a more meaningful size. Of the 32 items in the attitude measuring device, 17 were thus grouped into two principal factors. While this was a small collection from which to generalize beyond the immediate populations, Nunnally (1978, p. 208) pointed out that "even when tests have as few as 10 items, reliability estimates are rather precise."

The value difference between factor one and the total suggests some systematic differences in content; between combined factors two and three and the total measure there is a decided difference. The correlation matrix supported these separations yet correlations with the total measure remained within a reasonable range.

TABLE D3

RELIABILITY COEFFICIENTS,
ALL ENTRY RESPONDENTS

Total Measure	
Alpha	0.849
Estimated correlation with True Scores	0.921
Standardized item alpha (32 items)	0.875
Factor 1	
Alpha	0.721
Estimated correlation with True Scores	0.849
Standardized item alpha (9 items)	0.752
Factor 2	
Alpha	0.564
Estimated correlation with True Scores	0.751
Standardized item alpha (5 items)	0.566
Factors 2 and 3	
Alpha	0.548
Estimated correlation with True Scores	0.740
Standardized item alpha (8 items)	0.581

TABLE D4

FACTORS AND TOTAL MEASURE,
PRODUCT-MOMENT CORRELATIONS

At Entry	Total Measure	Factor 1	Factor 2	Factors 2 and 3
Total Measure	1.000			
Factor 1	.845	1.000		
Factor 2	.719	.405	1.000	
Factors 2 and 3	.749	.387	.872	1.000

For descriptive convenience, the first principal factor was labelled "environmental conservation" and the second, the combination of factors two and three, was labelled "socio-political" to reflect their apparent content.

The fifteen items excluded from the principal factors appeared to fall into three categories which might be called personal behavior attitudes, personal benefits, and specific environmental education attitudes. These items did not themselves load into factors but ran across all other factors similarly, apparently indiscriminately. Adjustment of means and standard deviations to allow for the differences in scoring ranges showed average values of the total measure slightly inflated by the additional fifteen items with the standard deviation noticeably diminished.

TABLE D5

MEANS COMPARISON, TOTAL AND FACTORS, ADJUSTED TO PRINCIPAL FACTOR 2

	Mean	Standard Deviation
Total measure, entry	25.866	3.192
Factor 1 environmental conservation	25.076	4.256
Factor 2 socio-political factor	24.950	3.705

TABLE D6

ATTITUDE MEASURE STATEMENTS
Mean Scores by Groups
(Range: 0 to 4)

Statement Number	Factor	1978E	1979E	1978G	1979G
6	1	2.75	2.90	2.92	2.76
7		3.75	3.82	3.79	3.83
8	1	2.75	3.09	2.57	2.91
9	2	3.13	3.39	3.26	3.33
10	1	3.11	2.97	3.30	3.26
11		3.08	3.39	3.23	3.26
12		3.16	3.34	3.13	3.45
13		3.07	3.25	3.24	3.31
14		3.08	3.06	3.36	3.24
15	2	2.88	3.08	3.00	3.10
16		3.64	3.77	3.79	3.71
17	1	3.19	3.22	3.08	3.21
18	1	3.08	3.09	3.15	3.21
19		3.18	3.12	3.09	3.36
20	2	2.68	2.66	2.55	2.90
21		3.73	3.79	3.57	3.81
22		3.71	3.78	3.72	3.90
23	1	3.36	3.39	3.11	3.57
24	2	3.17	3.31	3.23	3.38
25	1	3.47	3.58	3.51	3.64
26	1	3.26	3.35	3.38	3.38
27	1	3.13	3.16	3.08	3.26
28		3.24	3.21	3.26	3.33
29		3.72	3.68	3.72	3.69
30	2	3.42	3.31	3.28	3.55
31	2	2.93	3.18	3.08	3.33
32		3.38	3.36	3.53	3.50
33	2	3.12	3.08	3.06	3.12
34		3.13	3.27	3.21	3.31
35		3.21	3.23	3.28	3.33
36		3.12	3.04	3.21	3.24
37	2	3.49	3.50	3.66	3.52

APPENDIX E

APPENDIX E

PERCEIVED CONTENT LIST

To arrive at a determination of the content of environmental education as perceived by those attending the Teachers' Environmental School, a list of topics was synthesized. The specific subject titles were derived from several sources:

Environmental Education Guidelines, Michigan Department of Education, 1973.

Fundamentals of Environmental Education, United States Department of Health, Education and Welfare, 1976.

Toward an Action Plan: A Report on the Tbilisi Conference on Environmental Education, United States Department of Health, Education and Welfare, 1978.

Michigan's Environmental Future, Governor's Environmental Education Task Force, (Michigan), 1973.

School District of the City of Royal Oak, Royal Oak, MI.

School District of the City of Ferndale, Ferndale, MI.

Ovid-Elsie School District, Elsie, MI.

Oakland Community College, Bloomfield Hills, MI.

Mid-Michigan Community College, Gladwin, MI.

University of Michigan, Ann Arbor, MI.

Michigan State University, East Lansing, MI.

These listings often used broad titles such as "social sciences," phrases such as "cultural and economic dimensions,"

clauses and whole sentences in addition to specific subject topics to delineate the scope of environmental education. An integrated assembly of these listings produced 69 subject areas.

In order to reduce this list to a manageable size and clarify the topics into titles with easily recognizable specificity, the 69-subject list was subjectively correlated with listings of academic and non-academic subject titles from the local school districts, intermediate school districts, community colleges, and universities. Distinctions between subject areas were sometimes difficult to draw and are to that extent arbitrary.

The final list of topics was titled as the researcher anticipated they would be distinct in the minds of the respondents. The resulting school-subject list is considered representative of the range of subjects readily identifiable by most educational institutions and teachers and which would be included by state, national and international organizations within the scope of environmental education.

Responses to the perceived content list were examined for normal distribution using the Kolmogorov-Smirnov one-sample test for goodness of fit. Those thirty five teachers in the combined entry group who checked all twenty eight items were eliminated from the analysis. The remainder had scores ranging from 4 to 27. The K-S test indicated no basis for rejecting the assumption of normal distribution in the less-than-28 population.

Homoscedasticity was examined for the entry groups including and excluding those responding with all 28 items. The results indicated reasonable support of the homogeneity of variance assumption for the exclusionary group.

TABLE E1

HOMOGENEITY OF VARIANCE TEST

	Range 4-27	Range 4-28
Between measures ANOVA F	103.56	93.36
Hotelling's T-squared F	116.57	24.15

Reliability estimates were high for both groups.

TABLE E2

RELIABILITY COEFFICIENT ALPHA, ALL ENTRY RESPONDENTS

	Range 4-27	Range 4-28
Alpha	0.882	0.932
Estimated correlation with True Scores	0.939	0.965
Standardized item alpha (28 items)	0.869	0.922

APPENDIX F

APPENDIX F

CODEBOOK

Card 1

Variable Number	Card Col. Numbers	Field Width	Description
1	1-4	4	Respondent number
2	5	1	Card number of case
3	6	1	Vocation (Ques 88) 1 = teacher, K-12 2 = TES staff 3 = DNR personnel 4 = nature center, 4-H, naturalist, park & rec 5 = student 6 = post hi school instruct 7 = other
4-31	7-34	28 (1 ea.)	Perceived content (Ques 1) 0 = not included 1 = included in env. ed.
32-43	35-46	12 (1 ea.)	Michigan Public Opinion Survey 0 = NOT a problem 1 = SLIGHT problem 2 = MODERATE problem 3 = SERIOUS problem

Card 1 (cont'd)

Variable Number	Card Col. Numbers	Field Width	Description
44-75	47-78	32 (1 ea.)	George Data (Ques 14 thru 45) 0 = FULL DISAGREEMENT with MOST FAVORABLE attitude 1 = PARTIAL DISAGREEMENT 2 = Undecided 3 = PARTIAL AGREEMENT 4 = FULL AGREEMENT See questionnaire sample for MOST FAVORABLE attitude (Appendix A)

Card 2

Variable Number	Card Col. Numbers	Field Width	Description
76	1-4	4	Respondent number
77	5	1	Card number of case (2)
78	6	1	Number of Prof. Journ. Biophysical read regularly
79	7-8	2	Total hours per month spent with publications in var 78
80	9	1	Number of Prof. Journ. Meth. & Tech. read regularly
81	10-11	2	Total hours per month spent with publications in var 80
82	12	1	Number of Spec. Int. Nature, Environ. read regularly
83	13-14	2	Total hours per month spent with publications in var 82
84	15	1	Number of Spec. Int. Sports read regularly
85	16-17	2	Total hours per month spent with publications in var 84
86	18	1	Number of Spec. Int. Sci. & Tech. read regularly
87	19-20	2	Total hours per month spent with publications in var 86
88	21	1	Number of Spec. Int. Other read regularly
89	22-23	2	Total hours per month spent with publications in var 88
90	24	1	Number of Gen. Int. News read regularly
91	25-26	2	Total hours per month spent with publications in var 90
92	27	1	Number of Gen. Int. Feature read regularly

Card 2 (cont'd)

Variable Number	Card Col. Numbers	Field Width	Description
93	28-29	2	Total hours per month spent with publications in var 92
94	30	1	Number of times per day watch TV news 0 = 0 1 = 1 2 = 2 3 = 3 etc.
95	31	1	Number of times per day listen to radio news 0 = 0 1 = 1 2 = 2 3 = 3 etc.
96	32	1	Detroit Free Press 0 = no 1 = yes
97	33	1	Detroit News 0 = no 1 = yes
98	34	1	Ann Arbor News 0 = no 1 = yes
99	35	1	State Journal 0 = no 1 = yes
100	36	1	Grand Rapids Press 0 = no 1 = yes
101	37	1	Other newspapers and Sunday only of a daily 0 = none 1 = 1 2 = 2 3 = 3 etc.
102	38	1	Total newspapers read 0 = none 1 = 1 2 = 2 3 = 3 etc.

Card 2 (cont'd)

Variable Number	Card Col. Numbers	Field Width	Description
103	39	1	blank
104	40	1	Objectivity rank, magazine writer 1 = 1 best 2 = 2 3 = 3 4 = 4 poorest
105	41	1	Objectivity rank, newspaper reporter same as var 104
106	42	1	Objectivity rank, radio news reporter same as var 104
107	43	1	Objectivity rank, TV news reporter same as var 104
108	44	1	Credibility, National TV News 1 = not credible to 7 = very credible
109	45	1	Credibility, Local TV News same as var 108
110	46	1	Credibility, TV Specials same as var 108
111	47	1	Credibility, TV Documentaries same as var 108
112	48	1	Credibility, Public Television same as var 108
113	49	1	Credibility, Nat'l Radio News same as var 108
114	50	1	Credibility, Local Radio News same as var 108
115	51	1	Credibility, Radio Specials same as var 108

Card 2 (cont'd)

Variable Number	Card Col. Numbers	Field Width	Description
116	52-54	3	Minutes per day watching television
117	55-57	3	Minutes per day listening to radio
118	58-60	3	Minutes per day reading newspapers
119	61-63	3	Minutes per day reading magazines
120	64	1	Acquainted with Cooperative Extension Service 0 = no 1 = yes
121	65	1	Use publications of CES 0 = no 1 = yes
122	66	1	Use in classroom 0 = no 1 = yes
123	67	1	Use for preparation 0 = no 1 = yes
124	68	1	Use for own needs 0 = no 1 = yes
125	69	1	Credibility, Coop. Ext. Serv. same as var 108
126	70	1	Source reliability rank, general magazines 1 = 1st choice to 7 = 7th choice
127	71	1	Source reliability rank, professional journals same as var 126
128	72	1	Source reliability rank, newspapers same as var 126
129	73	1	Source reliability rank, formal classes same as var 126

Card 2 (cont'd)

Variable Number	Card Col. Numbers	Field Width	Description
130	74	1	Source reliability rank, colleagues same as var 126
131	75	1	Source reliability rank, CES bulletins same as var 126
132	76	1	Source reliability rank, special interest periodicals same as var 126
133	77	1	Conflict resolution 0 = none selected 1 = radio 2 = colleagues 3 = newspapers 4 = television 5 = more than one selected

Card 3

Variable Number	Card Col. Numbers	Field Width	Description
134	1-4	4	Respondent number
135	5	1	Card number of case (3)
136	6	1	Present grade or subject 1 = K-3 2 = 4-6 3 = Middle or Jr. High 4 = High School 5 = College 6 = Phys Ed. 7 = Music, Art, Library, Administration, etc. 8 = Outdoor Ed. spec., multiple grades 9 = non-formal ed., special subject area 0 = post high school, spec. subject area
137	7	1	Prior grades or subjects same as var 136
138	8	1	Conduct outdoor environmental learning experiences 0 = no 1 = yes
139-143	9-13	5 (1 ea.)	Where conduct var 138 0 = not marked 1 = marked
144	14	1	Involved students out-of-school 0 = no 1 = yes
145	15	1	Number of times var 144 0 = none 1 = 1 to 5 = 5 6 = more than 5
146	16-18	3	Minutes per week on Env. Ed. (Ques 61)
147	19-21	3	Min. per week on E.E., others (Ques 62)

Card 3 (cont'd)

Variable Number	Card Col. Numbers	Field Width	Description
148	22-23	2	Classroom contact time in hours per week
149	24	1	Member of MEEA 0 = no 1 = yes
150-156	25-31	7 (1 ea.)	Attendance influence 0 = not marked 1 = marked
157	32	1	Length of prior knowledge 1 = 0-3 months 2 = 4-6 months 3 = 7-9 months 4 = 10-12 months 5 = 1-2 years 6 = more than 2 years
158	33	1	Decision on prior knowledge same as var 157
159	34	1	Civic group memberships 0 = 0 1 = 1 2 = 2 3 = 3 4 = more than 3
160	35	1	Professional organization memberships same as var 159
161	36	1	Recycle 0 = none marked 1 = paper 2 = bottles 3 = cans or metal goods 4 = paper and bottles 5 = paper and cans 6 = bottles and cans 7 = all three

Card 3 (cont'd)

Variable Number	Card Col. Numbers	Field Width	Description
162	37	1	Projects 0 = none marked 1 = clean-up campaign 2 = beautification project 3 = protection project 4 = clean-up & beautify 5 = clean-up & protect 6 = beautify & protect 7 = all three
163-165	38-40	3 (1 ea.)	Influence action 0 = no 1 = yes
166-168	41-43	3 (1 ea.)	Influence effect perception 0 = no 1 = maybe 2 = yes
169	44	1	Environmental crisis 0 = NOT a problem 1 = SLIGHT problem 2 = MODERATE problem 3 = SERIOUS problem
170	45	1	Friends share view 0 = no 1 = some of them 2 = yes
171	46	1	Family share view 0 = no 1 = some of them 2 = yes
172	47	1	Public defense 0 = no 1 = yes
173	48	1	Workshops attended 0 = 0 1 = 1 2 = 2 3 = 3 etc.

Card 3 (cont'd)

Variable Number	Card Col. Numbers	Field Width	Description
174	49	1	Age group 0 = under 19 1 = 19-34 2 = 35-49 3 = 50-64 4 = 65 or above
175	50	1	Sex 1 = male 2 = female
176	51	1	Married 0 = no 1 = yes
177	52	1	Children 0 = no 1 = yes
178	53	1	Ethnic group 1 = American Indian 2 = Black 3 = Latin American 4 = White 5 = Other
179	54	1	Educational level 1 = High School 2 = Associate Degree 3 = Bachelor's 4 = Master's 5 = Ph.D.
180	55	1	Present community 1 = 0-5 years 2 = 5-10 years 3 = more than 10 years
181	56	1	Adult community 1 = city 2 = suburb 3 = small town 4 = country 5 = more than one of above
182	57	1	Child community 1 = city 2 = suburb 3 = small town 4 = country 5 = more than one of above

Card 3 (cont'd)

Variable Number	Card Col. Numbers	Field Width	Description
183	58	1	TES year 0 = 1978 entry
184	59	1	TES University session 1 = MSU 2 = EMU 3 = WSU 4 = CMU

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