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A PROFILE OF ATTITUDES, ACTIONS AND COMMUNICATION BEHAVIORS OF TEACHERS ENTERING AN ENVIRONMENTAL EDUCATION EXPERIENCE

presented by

Douglas C. Covert

has been accepted towards fulfillment
of the requirements for

MASTER OF SCIENCE degree in Fisheries and Wildlife

Robert W. George

Major professor

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A PROFILE OF ATTITUDES, ACTIONS AND COMMUNICATION BEHAVIORS OF TEACHERS ENTERING AN ENVIRONMENTAL EDUCATION EXPERIENCE

by

Douglas C. Covert

A THESIS

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

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Department of Fisheries and Wildlife

1980

ABSTRACT

A PROFILE OF ATTITUDES, ACTIONS AND COMMUNICATION BEHAVIORS OF TEACHERS ENTERING AN ENVIRONMENTAL EDUCATION EXPERIENCE

By

Douglas C. Covert

This descriptive study measures a selected population along five dimensions regarding the environment: attitudes, actions, education practices, perceived scope of environmental education and consumption of mass media.

A survey questionnaire of 88 items used Likert scale, multiple choice, rank-order and quantity self-reports. Statistical procedures were computer performed. Frequency distributions, central tendencies, degrees of dispersion and confidence intervals are reported. Comparisons are made using chi square, t-test, Pearson's product-moment and nonparametric correlations.

The population had strong attitudes favorable to environmental conservation with personal actions one-third as strong. Less than four percent of teacher-student contact time was given to environmental education. About half of the school curriculum was seen as related to environmental education with emphasis placed on outdoor programs.

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The group used mass media extensively, emphasizing magazines and television's special and documentary programs. Respondents showed no preference between interpersonal and media sources for conflict resolution.

ACKNOWLEDGEMENTS

I wish to express my sincere appreciation to Professor Robert W. George, committee chairman, and to other members of my committee, R. V. Farace, R. V. Hudson and D. I. Johnson for their guidance and encouragement, especially in the early stages of development of this study.

I am also gratefully indebted to Professor J. F. Scotton of Marquette University for critical commentary on the methodology as it was being developed.

Special gratitude is due Professors D. A. Bozardt and R. E. Righter of Oakland University and R. C. Wycoff of the University of Maryland and Heritage Conservation and Recreation Service, Department of Interior, for their interest and enthusiasm which led to this undertaking.

Thanks, too, are directed to all of the faculty members of the Teachers' Environmental School, not only for their assistance in this study, but especially for their continuing dedication to the purposes of environmental education.

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CHAPTER I

INTRODUCTION

There has been accelerating growth in concern for the earth's biological and physical resources. This has resulted in proliferation of educational programs focusing on the biological and physical environment of people. Active development of both structured and non-structured instructional programs, especially those directed at young people, has taken place. In the state of Michigan, the Department of Education has stated that

> . . . 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)

This summation describes an essential view of educators toward the programs commonly termed "environmental education."

In an effort to define environmental education, the Governor's Environmental Education Task Force in Michigan's Environmental Future said:

> Environmental education is the basic process leading toward the development of a citizenry that is aware of and concerned about the environment and its associated problems, and that has the knowledge, skill, motivation and commitment to work toward solutions to current and projected problems. (Governor's Environmental Education Task Force, 1973, p. 14)

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It is these two principal statements from which this study developed.

There has been rapid expansion of school curricula and instructional content supporting environmental education. Much of the material and many of the concepts have arisen from roots established over many decades. The beginning of environmental education in the United States is traced by some, such as Jones (1976), to Wilbur Jackman's Nature Study in the Common Schools, published in 1891. Under a variety of names, nature study persists.

The next chronological stage frequently cited is the outdoor education movement of the 1920s. Broad programs of outdoor education, often tied to specific school subjects such as biology, were developed and still retain popularity.

The 1930s saw the rise of conservation education with its emphasis on wise use of natural resources. These programs received extensive although certainly inadvertent support from the severe economic struggles which spawned the Civilian Conservation Corps and the Works Progress Administration. This period saw, too, the exposure of severely exploitive land use practices with a resulting emphasis on conservation practices. Many public and private institutions became devoted to promoting the wise use concept.

Environmental education is an outgrowth of these. It is not revolutionary, yet neither is it evolutionary. It is, rather, a synthesis of these antecedents and of other disciplines.

Among those who have written about environmental education, one word of description stands out as a consensus: interdisciplinary. The biological and physical sciences are usually stressed as fundamental because they are studies of the all-encompassing environments which make up the earth and within which humans function. Some stipulate that there is only a single environment, indivisible, and call it biophysical. Yet all include the human-centered fields of study, or disciplines, with varying degrees of emphasis on the humanities, political science, social science, economics, psychology and the technological sciences.

The broad scope of environmental education received congressional endorsement in the Environmental Education Act, Public Law 91-516, of October 1970, with a definition of environmental education echoed by the United States Office of Education:

> . . . 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).

Further, the Senate of the State of Michigan in Concurrent Resolution No. 69 of June 1971 described environmental education as including

> . . . teaching . . . of attitudes and skills involving the relationship between man and the quality of his cultural and biophysical environment . . . understanding of ecology and man's activities within the context of the natural community . . . our environmental heritage . . . preservation and enhancement of natural areas and recreation land for leisure time use; planning for wise

> land use; and the increased stress placed on the environment by growing technology and human populations . . . (State of Michigan Legislature, Senate Concurrent Resolution No. 69, June 1971).

The combinations of generalities and specifics create an elusive definition which is better labelled description. A functional definition of more general value was offered by Stapp, et al., in 1971:

> Environmental education is aimed at producing a citizenry that is knowledgeable concerning the biophysical environment and its associated problems, aware of how to help solve these problems, and motivated to work toward their solution.

This was further amplified in description of other aspects of environmental education which Stapp, et al., considered of equal importance. These aspects may be most readily summed up as human cultural institutions and man-made components, both of which have their technological aspects and often overlap.

The definition previously cited from Michigan's Environmental Future (page 14), to which report Stapp was an important contributor, was a further attempt at a concise, understandable and useful definition. A significant development was the additional emphasis on environmental education as a process.

With the stress put on process, attempts at further development of definition were largely abandoned in favor of the more practical approach: the development of guidelines, goals and objectives for teachers to follow in their efforts at environmental education.

A primary difficulty faced by the formulators of any definitions, goals, objectives and guidelines is that environmental education is holistic. It is sufficiently multidisciplinary and interdisciplinary that it is an integrated whole with characteristics independent of and greater than the sum of its parts. This point has been consistently acknowledged either directly or indirectly. Brevity, conciseness and specificity are antithetic to holism.

Considering the problems inherent in descriptive and definitive efforts, it would seem reasonable to accept the indistinct character of the statements and focus instead on the mechanisms, the process for achieving the desired results.

All of the foregoing descriptions of environmental education require a communication of information. The principles of communication, then, must be considered in any plan designed to achieve the results stipulated for environmental education. In a simplified form, using the 1949 model of communication developed by Shannon and Weaver, the three primary factors in communication are source, message and receiver, the last being further delimited as destination by Shannon and Weaver. It would be wise, of course, to include additional factors such as medium of transmission, signal characteristics, gatekeeping, "noise," feedback and other impinging or mediating factors. The three-factor model has the virtue of simplicity adequate for initial purposes and

demonstrates some of the complexities which investigators encounter.

A primary mechanism for the transmission of information in the context of environmental education is the teacher. The teacher serves at various times in each of the three roles of the communication model: source, of information for the pupil; message, as model for the pupil; and, receiver, of information from another source.

The teacher, then, should be an essential and early focus of environmental education efforts.

CHAPTER II

PERSPECTIVE AND REVIEW OF THE LITERATURE

The term "environmental education" was first used in nationally distributed literature in 1968 in the September issue of Education Record, according to Malcolm Swan (1975). Since that appearance of the term, there have been many attempts to define the scope of the subject. There has been decided progress from the early broad-stroke descriptions, such as those appearing in Volume 1 of the Journal of Environmental Education, 1969-70, through the interdisciplinary-multidisciplinary-pandisciplinary contentions, as summarized by Harvey (1976) and Vlasin (1978), to the usable practicality of curriculum planning and development with specified goals, typified by Jinks (1975) and Hungerford, et al. (1978).

There have been arguments as to whether definitions should place emphasis on the facts or on the processes of education in environmental affairs (Tanner, 1974). With some fluctuation, there seems to be a tendency toward balance developing in this issue, especially with the support of research such as that by Howie (1974).

Still, there are researchers such as Harvey (1976) who would change the now-accepted name to one which would in

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itself more narrowly define both the scope and the methodology, and correct the grammatical problem rarely mentioned by advocates or practitioners.

The breadth of environmental education in its expansion from the biophysical ecology bases is demonstrated by the extension of the title to encompass "ecological psychology" (Barker, 1968), "social ecology" (Binder, et al., 1975) and "environmental psychology" (Baum, et al., 1978).

Yet environmental educators such as Childress (1978) fall back on the biophysical base in describing specific objectives, expanding the scope with the ill-defined terms of awareness, recognition, appreciation, motivation, concern and positive attitude as descriptors. Nor are the writers alone in this for when Calcote (1976) surveyed high school biology teachers he found, not unexpectedly, that biophysical concepts strongly outranked sociocultural concepts as perceived central components of environmental education.

There appear to be two viewpoints in approaching environmental education definition and methodology: that of the synthesizers and that of the reductionists. Whatever the merits of these apparently different views, implementation remains an essential concern.

The multitude of descriptions, only some of the describers being mentioned here, have been drawn by people strongly concerned with the concept and its effects, either from the theoretical, top-down approach or the practicing teacher-specialist, bottom-up approach. All, to varying

degrees, have been specialists. All, too, have espoused the view that environmental education should thoroughly pervade society. The schools are seen as forming the structural foundation for long-term influence.

But there is little in the literature to indicate that researchers have gone to the on-line, every day, classroom-nonspecialist teachers, even those with expressed interest in environmental education, to determine how environmental education is viewed before those teachers have been indoctrinated with definition and method from the specialists' viewpoints.

The views of population subgroups, while perhaps consistent within themselves, may differ markedly from those of other groups within the population. Teachers as a general group may not correspond with the audience expectations of environmental education program planners. Curriculum planning may need to be different for teacher-training and for pupil-education. Foerstel (1976) found little or no consistency in environmental problem ranking when he analyzed four groups in a single community: high school seniors, their parents, some of their teachers and members of two groups commonly identified as environmental action groups, the Sierra Club and the National Audubon Society (Sellers, 1973, p. 53).

If teachers are in the front-line of environmental education, it is appropriate to determine their views as to the scope of environmental education. Those involved with

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the training of teachers might then have a better idea of the entry characteristics of the target audience. "Know your audience" is a basic precept of any communication effort.

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), seem to contend that favorable attitudes will arise directly from a sound information base. Research does not always support this view as witnessed by Stamm and Ross (1966), Swan (1970), Tichenor and Bowers (1971), Stamm and Bowes (1972) and others. Also, favorable attitudes may be less strongly held with increasing knowledge, as concluded by Kupchella and Levy (1975), although they may still remain favorable.

Consensus remains that attitudes are critical to "the maintenance of a suitable planetary environment." The need to retain a distinction between knowledge and attitudes in constructing environmental education programs is well-exemplified by Hungerford (1975) as he emphasizes the difference between the study of ecology and the study of the environment: "Ecology is a science and is not value-laden;

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Although some would draw a careful distinction between opinion and attitude, it seems pointless in the environmental context. Both assume judgment based on personal values and it is this value system effect that is considered in most measurement attempts; whether the measure is of opinion or attitude is academic (Stamm, 1972; Gallagher, 1977).

What is important is that knowledge of an environmental education audience requires knowledge of the audience outlook toward the subject. This outlook is a blend of the cognitive and affective domains when considering environmental problems. For most purposes it is useful to employ the guidance of Rosenberg and Hovland (1960) and view attitudes as the term of choice.

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 instrument, 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. The obvious implication is that there was insignificant change (or that no attempt at well-defined measurement of teachers was made, an unlikely

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situation in the test circumstances). Perhaps a different attitude measuring instrument would be more sensitive to changes, or a different treatment program is needed for teachers.

Another consideration is expressed by Kelman (1958) that attitude changes by teachers may be less durable than those of students in the absence of surveillance, meaningful relationship or relevance.

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. One 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 is supported by Friedman, et al. (1972).

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Many issues, studied by social scientists, are viewed differently by people from urban areas and those from rural areas (Bettinghaus, 1977). Environmental issues would appear to follow this pattern for secondary school students, as found by Leftridge (1977), at least as far as perceptions are concerned. One might question whether or not this difference holds true for teachers from urban or rural circumstances. It might well be posited that teacher education programs create a more consistent and cosmopolitan attitude not necessarily congruent or even compatible with students or parents of the community. This would follow from Bishop's point (1976) that ideological consistency is a function of educational experience. Although Leftridge found a difference without regard for "issue, geographic setting of the problem, or amount of educational background of the (student) subjects," the working environment, professional colleagues, life styles and educational uniformity of teachers may result in more consistency of response without regard for differences in urban-rural surroundings of homes or workplaces.

In addition, Murch (1971) found that

> . . . inclination to identify pollution as a significant problem steadily increased as the reference moved away from the respondent's immediate surroundings.

Such findings may be reflected in the Leftridge study and may also have an effect on teacher-student interchange in either rural or urban schools; the more cosmopolitan teachers would be expected to be incongruent with rural students and perhaps with urban students as well.

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Environmental education programs may be constructed differently for urban and rural audiences of students but may not require this same difference in approach for training of teachers. If teachers are consistent in their outlook, they nonetheless need to be aware of and react to the differences in their audiences. This may well require adjustment in teacher-training programs so that the individual teacher may learn to adapt to student needs and student attitudes in the environmental area. As Tanner (1974) notes, "75 to 80 percent of our youth are geographically separated from the land which must sustain them . . . ." Differences between the orientations of teachers and of their students toward environmental matters may be highly significant in the effectiveness of environmental education programs.

> An attitude is generally defined as a learned predisposition to respond to an object or class of objects in a consistently favorable or unfavorable way . . . (Gross and Niman, 1975, p. 358).

Three component classes are generally accepted: cognitive (belief), affective (feeling) and behavioral. Gross and Niman point out that there are usually no distinctions made between these classes in attitude measuring but that attitudes are operationally defined by verbal measures and evaluations of the responses are treated as composites. These verbally measured attitudes are not reliable as predictors of overt behavior, however, due to the influence of personal, situational and methodological factors.

A study by Weinstein (1972) indicates a need to

combine attitude toward an issue and attitude toward an action rather than either alone to suggest behavior predictability. He proposes that a negative action attitude will probably prevail over a positive issue attitude. Further, he found that a positive action attitude and a positive issue attitude do not make for a reliable predictor of behavior either. This is supported by Schuman (1972) in his "situational variability" which usually results in compromise where the positions taken tend to reveal relative strength of values.

In approaching the attitude-behavior relationship, Hungerford (1975, p. 26) stated that

> . . . there are professionals in environmental education who act as though environmentally literate behavior was something for the other feller (sic).

This attitude difference between the issues and the actions was further emphasized by Peyton (1977) when he found that less than half of the preservice 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. Indeed, Harvey's delineation (1976) avoided specifying actions as expected outcomes of environmental education referring to competence and dedication, the "intentions" of environmental literates, as the outcome goals.

Perhaps, as Hungerford suggests, where actions are concerned, environmental educators are not distinguishable

from a general population. Steininger and Voegtlin (1976) found that those "ordinary" people who performed an environmentally sound behavior (recycling, in their study) were operationalizing a positive attitude yet were not otherwise particularly distinctive from the surrounding population. In both groups, it seems that the doers are few while the talkers are many; apparently, environmental literacy advocates action but does not require it.

Another aspect of the attitude-behavior relationship is the tendency of teachers with positive environmental attitudes to conduct environmental education in their professional lives. While Ritz (1977) implied that personal actions and classroom practices fell within the same affective-behavioral construct, Cummings (1976) saw the classroom behavior as a distinct behavior pattern. Some of the identification difficulty for both the investigators and the subject teachers may lie with the definition of environmental education, the perceived scope of its content, identity of the best-qualified environmental teacher, the most appropriate site for environmental education activities and so on. Also, teacher perception of environmental education as a central or ancillary instructional track has a decided effect on classroom conduct.

Hungerford (1975) has pointed out the fallacy that the science teacher is the only one "who can successfully teach environmental education." Howie (1974) demonstrated that use of the outdoors was only part of an effective

environmental education program. A list of the inservice programs conducted around the United States designed to facilitate all teachers becoming environmental educators, both indoors and out, would be very extensive.

Much of the reluctance of individual teachers to incorporate environmental education programs into their continuing classroom conduct is a perceived low level of their own competency (Peyton, 1977; Ritz, 1977; Bozardt, 1976; Cummings, 1976; Hungerford, 1975; Howie, 1974). Because it is rarely noted that all education is environmental education (McInnis, 1972), there may be serious questions raised as to the validity of any attempts at measurement of incorporation unless measurements are confined to use of curricular materials. Perceptions alone often prove to be highly deceptive. Effective environmental educators, especially in non-science areas, may be excluded, however, if only material usage is counted or measured.

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. His study found only 18 percent of the teachers surveyed had no interest in environmental education while 70 percent were adopters of curricular materials. This latter figure may be compared with the 57 percent cited by Wint (1977).

The Cummings study is also of special interest in

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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 puts it, there appears to be "a desire to 'spice-up' the existing curriculum rather than to make substantive changes." Observations by Bozardt (1976) also emphasize this attitude.

One of the situational variables to be considered in evaluating classroom practices is that environmental education is value-laden and may be a somewhat sensitive area for many teachers who "must serve a clientele holding diverse ideals" (Tanner, 1974).

Another factor which may strongly affect teacher adoption of environmental education, particularly school-specified curricular materials, is psychological reactance. Miller's studies (1976) indicated that perceived attempts at persuasive manipulation often result in reaction opposite to the persuader's intention.

The consensus among environmental educators is well expressed in Michigan's Environmental Future:

> No one can escape environmental education . . . . Everyone learns about the environment. But exactly what are people learning? (Governor's Task Force, 1973, p. 2)

It might be assumed that teachers seeking environmental information for application in the classroom, or for their own edification, would be somewhat selective in their sources

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of information. There is little to indicate, however, that teachers are any more selective than a general population. Among Peyton's student teachers (1977), "only 20 percent of the participants reported belonging to an active environmental organization or reading an environmentally-related periodical regularly" while "61 percent reported intentions to take future environmental action." The question must then arise as to the source of the information on which they will base their actions; and, whether this position is also true for practicing teachers as well as students preparing to teach.

McNelly relates 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 proceeds to construct a conceptual case for information building a set of beliefs which, when related, form an attitude structure which then predisposes the holder to respond in a favorable or unfavorable manner. McNelly does not assume a direct or causal relationship in this system which would necessarily result in the predisposed behaviors but credits the situational variables with the final control. Nonetheless, he strongly promotes 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

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knowledge bore no relation to community members' attitudes."

In treating information acquisition, the "communicatory utility" of Atkin (1972) must not be overlooked. He defines this concept as "the anticipated usefulness of information for future informal interaction with family, friends, co-workers and acquaintances." He suggests a tendency toward information seeking when interpersonal communication is anticipated. This concept includes information receptivity as well as information searching. Perhaps the anticipation of communicatory utility rather than a belief in principles explains to some extent the popularity of attendance by teachers at how-to environmental education workshops when a subsequent increase in classroom environmental education does not appear.

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 rather 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 feedback and so teaching resembles interpersonal communication. The peculiar nature of this middle-ground would seem to warrant the continued use of the quasi-mass communication terminology.

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regulator and gatekeeper in the quasi-mass communication system involving students. As educator, however, the teacher also serves as a redistribution system which McNelly (1973) considers of vital importance to the total communication process. There is also a special opportunity for coorientation of teachers and pupils with the potential for agreement, accuracy and congruency relationships (Chaffee and McLeod, 1968) largely unexplored in the environmental arena.

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 at the same time sources. The Witt model will readily accommodate the agenda-setting influence of environmental educators, the importance of which is noted by Schoenfeld (1977), which other models do not.

The complexity of environmental mass communication and its possible effects, and the questionable potential for changing environmental attitudes, has been underlined by Stamm (1972). He further suggests that environmental education efforts may have little or no cognitive change effects involving high salience objects. Schoenfeld (1975), however, seems convinced that mass media have abundant potential for changing environmental attitudes toward nearly all objects. The apparent discrepancy seems to be due to Schoenfeld's optimism and Stamm's reluctance to predict without effective

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measuring instruments and much further study.

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. Schoenfeld (1975a) points to the success-record in communicating of the federal bureaus and voluntary associations and especially the Cooperative Extension Service. Yet there is little in the literature to show the mass communication media use patterns of teachers for information on environmental affairs, excepting the preservice teachers of Peyton (1977). The sources which teachers use to obtain the bulk of environmental information and from which they influence their students is still obscure.

Perhaps the work described by Dawkins and Krebs in the field of behavioral ecology, as noted by Wilbur (1979), should be considered by environmental educators in formulating programs to teach both teachers and their students:

> The old view of animal communication is that of interindividual cooperation as the product of coevolution of actor and reactor in which each informs the other of its internal state. In the new view, in animal communication, as in commercial television, the key word is not information but manipulation, persuasion, or advertisement.

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CHAPTER III

SIGNIFICANCE AND USE OF THE STUDY

This study was developed to determine the characteristics of a specific population of teachers along five dimensions:

1. perception of the scope of environmental education;
2. attitudes toward environmental affairs;
3. personal environmental actions;
4. professional environmental education activities; and,
5. use of mass media information sources on a continuing basis.

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, descriptive brochure.)

It was assumed that this population would be demonstrating, through behavior, a special interest in the biophysical surroundings or environmental education or both. The workshop experience required commitment to a five day,

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participatory, residential program during the summer, between academic years. While enrollment in this program would distinguish the study group from an average of teachers, it could also be expected to intensify some of the study results. It was expected that some of the findings would offer a basis for inference extending to teachers less interested in environmental or ecological matters.

* Little has been reported to date about the general characteristics of teachers as they enter an environmental education experience although a number of studies of details have been conducted.

* Even those teachers expressing interest in "environmentalizing" their teaching or volunteering for training in environmental education are not a well described audience.

* Findings of this study could indicate potential differences in the needs of teachers and of students participating in environmental education programs.

* Assessment of teacher use of mass media on a continuing basis could indicate the significance of various media as they influence the continuing development of teacher beliefs and attitudes.

* The information available as a result of this study could offer a basis for reexamining environmental education programs directed specifically at teachers and prospective teachers. With the information derived, it would then be possible to modify and adopt programs which would improve the effectiveness of environmental education in the schools.

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CHAPTER IV

DESCRIPTION OF THE STUDY

Hypotheses

The purpose of this study is to develop a quantitative profile of teachers who have demonstrated through behavior a special interest in their biophysical surroundings, in environmental education or in both. The information contributing to this profile was derived in response to three overriding questions:

1. What do teachers perceive as being within the scope of environmental education?

2. What do teachers do, personally and professionally, in contributing to environmental improvement?

3. Where do teachers get the information which continually influences their own attitudes and behaviors which they then carry into the classroom?

The study is primarily a descriptive, case-study approach. It is designed to provide a technique for measuring the characteristics, analyzing the data gathered and developing a useful profile. The hypotheses to be tested are comparative hypotheses as prescribed for social science research and are descriptive rather than predictive.

During development of the study, several operational

decisions were made leading to singular, descriptive propositions common in the physical and biological sciences that certain characteristics can, or cannot, be measured and classified using researcher-selected methods. These propositions may be divided into two classes, assumptions and premises. The assumptions are extensions and adaptations of the work of prior researchers to meet the particular needs of this study.

Assumption 1: An existing attitude measuring instrument will reliably measure the environmental attitudes of teachers who have self-selected for their interest in environmental education.

Assumption 2: The teacher-perceived scope of environmental education can be measured using a list of common academic topics.

Assumption 3: Mass media use and valuation patterns of the selected population may be measured using self-perception responses.

The operational premises are arbitrary decisions unique to this study.

Premise 1: Environmental attitude measurement and perceived scope of environmental education may be combined into an attitude index with utility for comparative purposes.

Premise 2: Personal environmental actions of the selected population may be combined into a quantitative index with utility for comparative purposes.

Premise 3: Environmental education practices of the

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selected population may be combined into a quantitative index with utility for comparative purposes.

Application or modification of the measuring instrument and the operational propositions will offer a basis and means for comparative studies.

Four hypotheses are central to this study. Stated in the null form, they are:

Hypothesis 1. There is no significant relationship between personal environmental actions and environmental attitudes of the selected teacher population.

Hypothesis 2. There is no significant relationship between environmental education practices and environmental attitudes of the selected teacher population.

Hypothesis 3. There is no significant relationship between media use patterns and environmental attitudes, personal environmental actions or environmental education practices of the selected population.

Hypothesis 4. The selected population shows no source preference in resolving conflicting environmental information received.

During development of the profile and the measuring instrument, two additional hypotheses were stated comparing the study group with other population sample groups and one additional hypothesis exploring an internal subdivision of the study group.

Hypothesis 5. There is no significant difference in attitudes between the selected population of 1978 and

a similar population of 1965.

Hypothesis 6. There is no significant difference in attitudes between the selected population and a randomly selected sample of Michigan citizens measured in a 1975 research project.

Hypothesis 7. There is no significant difference between urban and rural segments of the selected population in attitudes, personal actions or professional practices.

Population Selection and Description

The population selected for this study consisted of the persons attending any one of four one-week "Teachers' Environmental School" (TES) workshops conducted during the summer of 1978 at the Ralph A. MacMullan Conference Center operated by the Department of Natural Resources of the State of Michigan. Each of the four week-long workshops was conducted by a different Michigan university: Michigan State University, Eastern Michigan University, Wayne State University and Central Michigan University. The staff of each workshop session is composed of university faculty members, sometimes supplemented by graduate assistants, from the sponsoring university. Graduate and undergraduate credits are offered for each session and are interchangeable and transferable among the several participating universities. The university faculty staffs are augmented and supported by an environmental specialist from the Michigan Department of

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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, 1978) Each session, although based on the same theme, had its own specific emphasis as indicated in the titles and course descriptions. Pertinent excerpts from the course descriptions follow.

> Michigan State University: Basic Environmental Concepts, Exploring basic concepts of environmental conservation to meet goals and objectives of environmental education. (TES, 1978)
>
> 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. (TES, 1978)
>
> Wayne State University: Understanding Our Environment, Emphasis will be placed on field studies of the interrelationship of living organisms and their environment. . . . an opportunity to improve your understanding and attitudes about the environment and people. (TES, 1978)
>
> 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. (TES, 1978)

Enrollees at each workshop could expect to have opportunity to learn concepts and details useful in their professional practice of environmental education.

These populations were selected for study because they were made up of self-selected representatives of the teaching profession who were demonstrating through behavior an interest in their biophysical surroundings, environmental

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education or both. Intensity of this interest and individual motivations for attendance were not determined and may possibly 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. However, post-data-collection interviews and observation by the researcher indicated that the principal reason for attendance was educational; non-educational purposes were secondary. This was in keeping with the 1977 report by Born and Clark which indicated 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 area encompassed by environmental education.

These groups of TES teachers were, in effect, a "captive audience." The fact of their attendance in an academic program assured a high return of the questionnaire used as a measuring instrument and encouraged thoroughness in its completion. The "captive" situation might have been conducive to unwanted bias in responses but analysis of the

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data collected indicates that it was minimal in its overall effects with little reduction in the usefulness of the findings. This claim is supported especially by the Personal Action data and the self-report of time spent in environmental education.

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

Experimental Design

One hundred eighty persons attending four sessions of the Teachers' Environmental School during the summer of 1978 were asked to complete an environmental attitude profile questionnaire as an opening activity of the week-long workshop program. The eight-page questionnaire, containing 88 numbered items, was distributed by the researcher at the conclusion of a brief introduction and collected by the researcher as it was completed by each person.

The responses of each person were coded by the researcher and analyzed by statistical procedures, computer performed, to provide a view of the population as they perceived themselves in six major categories. These categories were:

I. Environmental Attitudes

II. Personal Environmental Actions

III. Environmental Education Practices

IV. Continuing Information Source Use

V. Continuing Information Source Value

VI. Demography of the Population.

Data evaluation included descriptive statistics and both parametric and non-parametric statistical procedures for two primary populations and two secondary populations within one of the primary populations of respondents. Relationships with three additional populations were also studied.

Assumptions and Limitations

In this study the following assumptions have been made which have or may have some effect on the findings:

1. The teacher population self-selected for interest in environmental education;
2. All members of the population self-identified as teachers were currently, had been or were to become teachers in Michigan schools with grades K-12;
3. Uncontrolled variables of the demographic characteristics would tend to distribute their effects widely throughout the experimental population and in a manner similar to that of Michigan teachers in general;
4. The completed measuring instruments accurately reflected the perceptions of the respondents at the time of measurement;
5. The data collection instrument measured the characteristics desired;

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6. Variations in the effects of the instrument administration timing would be broadly distributed throughout the responding population.

The following limitations of this study have been recognized but the possible effects will not be delineated.

1. The measuring instrument encompasses a small part of the range of knowledge and perceptions which might be used to describe the responding population;
2. The measuring instrument may benefit from alteration or modification in some or several of its items;
3. Some portions of the instrument may have affected the reliability of responses;
4. The season chosen for measurement may have affected responses in some portions of the instrument.

These assumptions and limitations should be weighed in evaluating, applying or extending the findings of this study.

Operational Procedures

The data collection stage of the study was scheduled by Dr. Robert W. George, chairman of the researcher's graduate committee and principal faculty member of the Teachers' Environmental School session conducted by Michigan State University. Dr. George arranged with the faculties of the other three TES sessions to allow data collection at the beginning of each of those sessions. The faculty members

from all of the participating universities considered this an excellent opportunity to learn more about their students as a group.

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. The instructional programs began early Monday mornings.

The survey's measuring instrument was to be administered either at the conclusion of the Sunday meeting or at the beginning of the Monday program. The researcher was present during the registration and the Sunday evening overview as a non-participating observer to evaluate the activities preceding data collection to subjectively judge the potential for contamination of responses. The activities were judged as enhancing the receptivity of those attending with minimal likelihood of survey 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 then briefly introduced the questionnaire approximately as follows:

> This questionnaire will help us find out where we are as leaders in environmental education. We need to know what we have as we enter this workshop. By taking

> inventory of ourselves we can better fit new information and new approaches into the conceptual patterns already established.
>
> This questionnaire is not a measurement of what we know. It is not an evaluation of what we do. Instead, it will help us get a clearer picture of our present practices and attitudes in environmental education. It will help us prepare ourselves to get the most out of this week's experience.
>
> It will take between 15 and 30 minutes to complete. Please answer not what you think you should, but your actual thoughts and practices.

The questionnaire was then distributed. The researcher remained in the room and collected each questionnaire as it was completed. Respondents left the room as they handed in their questionnaires. In each of the four sessions, the first questionnaire was completed within one-half minute of 15 minutes and the last questionnaire was completed at 32, 30, 31 and 32 minutes. In each session, the last completion was two to three minutes later than all others in that session.

Only three of the 180 respondents asked for clarification of any questions during the process. Each of these questions was different although all three related to the information source portions of the questionnaire. Two women respondents objected mildly to the inclusion of sex and marital status identification in the demographic portion of the questionnaire. Because these items appeared in the middle of the last page, the objections were considered to have had little or no contaminating influence on the

preceding portions. In any event, the comments were made in the manner of a friendly reproach rather than a serious criticism.

Scoring Procedures

The questionnaire results were coded and card-punched by the researcher for computer tabulation and analysis. The coding process recorded case identification and responses only, without interpretation other than classification. Some scoring was performed by the respondents as an integral part of the response process. Other scoring was performed during the process of analysis by computer and some as a result of researcher requests for computer re-scoring. Unusual scoring procedures will be explained with the presentation of the data analyses and interpretations. The codebook for coding and card-punching is included in Appendix B.

Statistical and Data Processing Procedures

Data analysis made use of the Statistical Package for the Social Sciences (SPSS) version 7.0 available to the Michigan State University Computer Center, using a Control Data Corporation 6500 computer system, from the Vogelback Computing Center, Northwestern University.

The questions of primary interest in this study and the hypotheses generated from them relate especially to

measures of central tendency and dispersion. From these, a profile of characteristics has been developed to broadly describe the population surveyed. The descriptive data obtained from simple-frequency analysis of the information collected indicates the average characteristic of the total population and the relative degree of variability within that population. Additionally, error limits, at a 95 percent confidence interval, indicate the degree to which the group measured would serve as an adequate simple random sample.

Several methods of investigating relationships were undertaken depending on the kinds of relationships of special interest and whether the data were nominal, ordinal, interval or ratio in nature.

Statistical Procedures Used

Throughout analysis and interpretation of the data collected in this study, central operating principles of scientific research have been maintained. As Krebs (1979) has noted, the key information of research can become lost in a welter of interesting but trivial information. So, too, can sophisticated statistical analyses conceal usefully simple information. Therefore, two basic and commonly expressed elements of good research have guided the analysis and interpretation of the data: first, 'the simplest, most straightforward method of study and of explanation is usually best' and, second, 'keep it short and simple.'

The quantitative profile to be developed through this

study is essentially a product of descriptive research, an effort to describe the population as it existed at a given moment. Frequency distributions, central tendencies and degrees of dispersion offer the primary descriptive information. The mean has been selected as the preferred indicator of central tendency because it is based on all the scores for any one item and the quantity value of each score. In some cases the frequency distribution shows one or more modes which may have special informative value and will be included in the data presentation when appropriate.

The measure of variability used in this report is the standard deviation (SD) because it has more intuitive value than the variance from which the SD is derived.

The 95 percent confidence interval (C.I.) is noted because it is a useful reliability indicator for the measurement data summaries. It is expressed as data values and as a percentage of the mean, the latter for its ready intuitive value. The C.I. is commonly used to indicate how closely the group measured would approach being a simple random sample adequate for inference to a larger population. It differs from the "confidence level."

A 95 percent confidence level for this study would have about 9 percent error tolerance, based on the sample size. If the group measured is assumed to be a sample of all teachers who have enrolled or would enroll in the TES, then the mean values of a sample of this size, 123 respondents, would be within 9 percent of the larger population 95 times

out of 100.

As a crude but utilitarian "rule of thumb," the lower the 95 percent C.I. percentage value, the more reliable the mean and SD figures are. C.I. percentage values less than 9, the error tolerance, are not approaching sampling perfection but narrow the gap at an ever faster rate between the summary figures of the sample and the 95 percent probability of sample accuracy. In other words, for this study, if the C.I. is 9 percent or less, the mean and SD values may be considered reliable measurements of the group studied and are good representations of a central tendency.

The standard error statistic may also be included for interval-level measurements to indicate the potential degree of discrepancy between the mean as a sample mean and the mean of the unknown population.

Student's t is the statistic used in some comparisons. The t-test indicates whether or not the difference in measured values between two sample means is significant. This test is customarily used when two groups are compared, on the basis of their means, in one dimension. In this study, the groups are not experimental but pre-exist with the distinction drawn based on some one differentiating characteristic. For the t-test comparative procedure, the null hypothesis is stated and accepted or rejected on the basis of the t-test results.

The null hypothesis typically states that the means of the two groups for one set of values are the same. The

t-test indicates the probability that the value differences between the two groups subjected to test are due to chance, or sample variability. If the t-test indicates that there is a significant probability of the difference being due to chance, then the null hypothesis of equality is accepted or at least not rejected. If the t-test indicates that the difference is probably not due to chance, then the null hypothesis of equality is rejected and the difference is assumed to have a strong probability of occurring with any other pair of samples. The t-test significance level considered acceptable in this study is .05. Errors of rejection or acceptance of the null hypothesis when the opposite choice may in fact be true may dictate the use of a different level of significance. Where these potential errors may have some important consequence, they will be noted in the presentation of the data.

In applying Student's t to the data analysis, the F value is computed. This value relates the variance between the groups to the variance within the groups and is used in multiple regression analysis procedures as well. The F value may also be used to test the null hypothesis. The TES groups showed, in some dimensions, such wide variance within groups that the F statistic was used as a screening device for the t-test rather than relying on it directly.

Regression analysis was not used in this study. Although much interesting information might have been developed, the straightforward profile development was

maintained without obscuring the central purpose amidst relationship studies of peripheral or tangential value. Such statistical studies are more appropriate to a secondary analysis of the data collected.

Pearson's product-moment correlation coefficient (Pearson's r) is used here to indicate the strength of any linear relationship which may exist between two variables. As the square of this value, r^2, is generally considered a more readily interpreted value when the direction of the relationship need not be expressed, r^2 is noted for convenience along with Pearson's r. Because this coefficient is designed for interval-level variables, its use with ordinal-level variables is subject to question. However, when supported by other correlation indicators and viewed with some skepticism, it may have some utility.

Spearman's rho and Kendall's tau rank-order correlation coefficients are more suitable for ordinal-level data than Pearson's r. Because the SPSS produces tau but not rho, Kendall's tau is the value used to indicate strength of ordinal-level linear relationships. Gamma may also be noted because its value is considered very intuitive, although it would appear to be advisable practice to use gamma only when tau is also available for verification purposes--unusually high values of gamma may be deceptive as to linearity.

Many comparisons in this study relate data that is only nominal-level. Contingency tables, crosstabulations, are displayed and interpretive statistics are offered. The

SPSS program supplies a variety of statistics for these bivariate correlation procedures some of which may prove to be inapplicable to the values as, for example, when Pearson's r is computed for nominal-level data. Choice of statistics presented will be in keeping with the nature of the data.

Chi-square, X^2, indicates whether a systematic relationship exists between two variables with a large value implying a relationship of some sort, but not defining it. Whether the "large value" is significant or not is shown by the significance value computed by SPSS with .05 being considered the critical maximum for this study.

The strength of a relationship which chi-square may indicate exists is shown by Cramer's V. Although chi-square may possibly show high significance, it need not be a strong relationship unless Cramer's V so indicates.

Two other statistics for nominal data may be included in the analysis presentation, lambda and uncertainty coefficient, but only if they have special pertinence and strength.

Eta-square, the correlation ratio, is also noted for contingency table analysis. It is included primarily because it has a general interpretive utility. The assumption in its use is that at least one of the data sets is interval-level. The reliability of correlation data may often be best interpreted from eta^2 when chi-square is significantly high and Cramer's V is in doubt.

In most of the contingency tables, the greatest interpretive value lies in inspection of the table.

Interpretations may then be supported or refuted by the statistics, or the statistics may be meaningless. Still, the descriptive value for the study group remains despite the loss of inferential or predictive value.

CHAPTER V

DEMOGRAPHIC DESCRIPTION OF THE POPULATION

The total population attending the four sessions surveyed at the 1978 Teachers' Environmental School was stratified on a single dimension, vocation, for primary analysis. The identifications chosen established three strata: teachers, employees of the Department of Natural Resources and others.

Stratification is a method by which investigators such as economists and sociologists subdivide populations. These subdivisions or strata may be based on specifically controlled conditions, by qualifying actual conditions or through pre-existing characteristics. The attempt in stratification is to define limits of groups in an effort to approximate homogeneity within each stratum. The stratification not only results in samples with smaller sampling error but also permits statements about a specific stratum which may not apply to others in a heterogeneous population. Because this research was focused on teachers, all of those not perceiving themselves as teachers were separated from the group of central interest.

Those who perceived themselves as teachers, without regard to titular status, made up the population which this

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study was devised to describe and analyze. Consequently, a curriculum coordinator, an elementary school principal and an assistant superintendent in a small district were included as teachers. Although some of these might not have been currently active in the classroom, they were perceived by the researcher as having direct influence on environmental education in the schools and therefore appropriate to be included. This population, subsequently to be referred to as Teachers, totalled 123 respondents.

Post-high school instructors such as college professors were considered to have an indirect influence on the conduct of environmental education in the K-12 schools and were categorized along with employees of nature centers, students, staff members of the TES and others in the 26 member group referred to as Others.

Employees of the Department of Natural Resources regularly attend the TES as a part of ongoing in-service training. Although some of these employees would choose to attend, Department policy requires it and there were, therefore, several who attended reluctantly. Questionnaires completed by these employees were carefully scrutinized by the researcher to detect questionnaires which might obstruct meaningful analysis. One such was found and, along with two insufficiently complete to be useful, was considered invalid. The elimination of these three reduced the group referred to as DNR to 28 respondents.

The group of essential interest, Teachers, is described in Table 1. From this it can be seen that those attending the 1978 TES sessions may be typified, for the most part, as young, white, women, married, probably without children at home and with at least a bachelor's degree. They have lived most of their lives in cities or small towns, with well-established residences in their current communities although not necessarily active in civic groups, are very likely members of two or more professional associations, and are probably teaching upper elementary grades now and have done so in the past.

These characteristics are in keeping with the traditional, stereotypical image of a teacher portrayed for decades in the entertainment media. The one exception might be the lack of civic group membership. The reported characteristics did not depart significantly from the general expectations of the researcher. No inferences should be drawn, however, that this group of teachers is representative of a larger population without appropriate qualification.

Age

25-34
35-44
45-54

Sex

Female
Male

Race

White
Black
Other

Marital

Married
Not

Child

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TABLE 1

DEMOGRAPHIC DESCRIPTION, 1978 TES TEACHERS

Item	Percent	Approximation of 95% C.I.
Age (N=122)		7.4%
19-34	54.1	
35-49	38.5	
50-64	7.4	
Sex (N=121)		12.5%
Female	67.8	
Male	32.2	
Ethnic group (N=121)		
White	97.5	
Black	1.7	
Other	.8	
Marital status (N=122)		12.5%
Married	67.2	
Not married	32.8	
Children in household (N=121)		19.1%
No	52.9	
Yes	47.1	
Education completed (N=121)		2.7%
Bachelor's	60.3	
Master's	38.8	
Ph.D.	.8	
Youth life community (N=121)		
City	33.9	
Suburb	19.0	
Small Town	27.3	
Country	19.8	
Adult life community (N=121)		
City	28.9	
Suburb	22.3	
Small Town	28.9	
Country	19.0	

TABLE 1 (cont'd.)

Item	Percent	Approximation of 95% C.I.
Resident present community (N=122)		6.5%
0 – 5 years	23.8	
5 – 10 years	24.6	
more than 10 years	51.6	
Civic group memberships (N=123)		24.5%
0	54.5	
1	21.1	
2	15.4	
3	2.4	
more than 3	6.5	
Professional organizations (N=123)		9.3%
0	4.9	
1	28.5	
2	33.3	
3	22.0	
more than 3	11.4	
Grades presently taught (N=123)		8.9%
K – 3	22.8	
4 – 6	35.0	
Jr. High School	12.2	
High School	17.1	
Special assignments	13.0	
Grades previously taught (N=49)		12.7%
K – 3	22.4	
4 – 6	42.9	
Jr. High School	16.3	
High School	18.4	

CHAPTER VI

ENVIRONMENTAL ATTITUDES PROFILE

The purpose of this and the next two chapters of the study was to determine, for the particular population, answers to questions which may be most simply stated as: What do actively interested teachers think about environmental affairs?, What do they do personally?, and, What do they do with their students? The questionnaire, Appendix A, elicited self-reporting based on facts recalled and self-perceptions.

It is essential to place emphasis on self-perceptions. Although the participants were urged in the introduction to the questionnaire to "answer not what you think you should, but your actual thoughts and practices," there is little doubt but that some bias toward the expected views of the researcher and the TES 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. Without observational follow-up, there may be significant biases present in the data. However, it will be seen from reports by the Teachers of lack of action a surprising candor which must lend credence to the overall self-evaluative technique.

The overall attitudes and actions profile is depicted in Figure 1. The data for each item have been selected and adjusted to represent per centum values for ready comparison. This chapter will present only the Attitudes portion; detailed information and interpretations are presented in separate sections and subsequent chapters of this report.

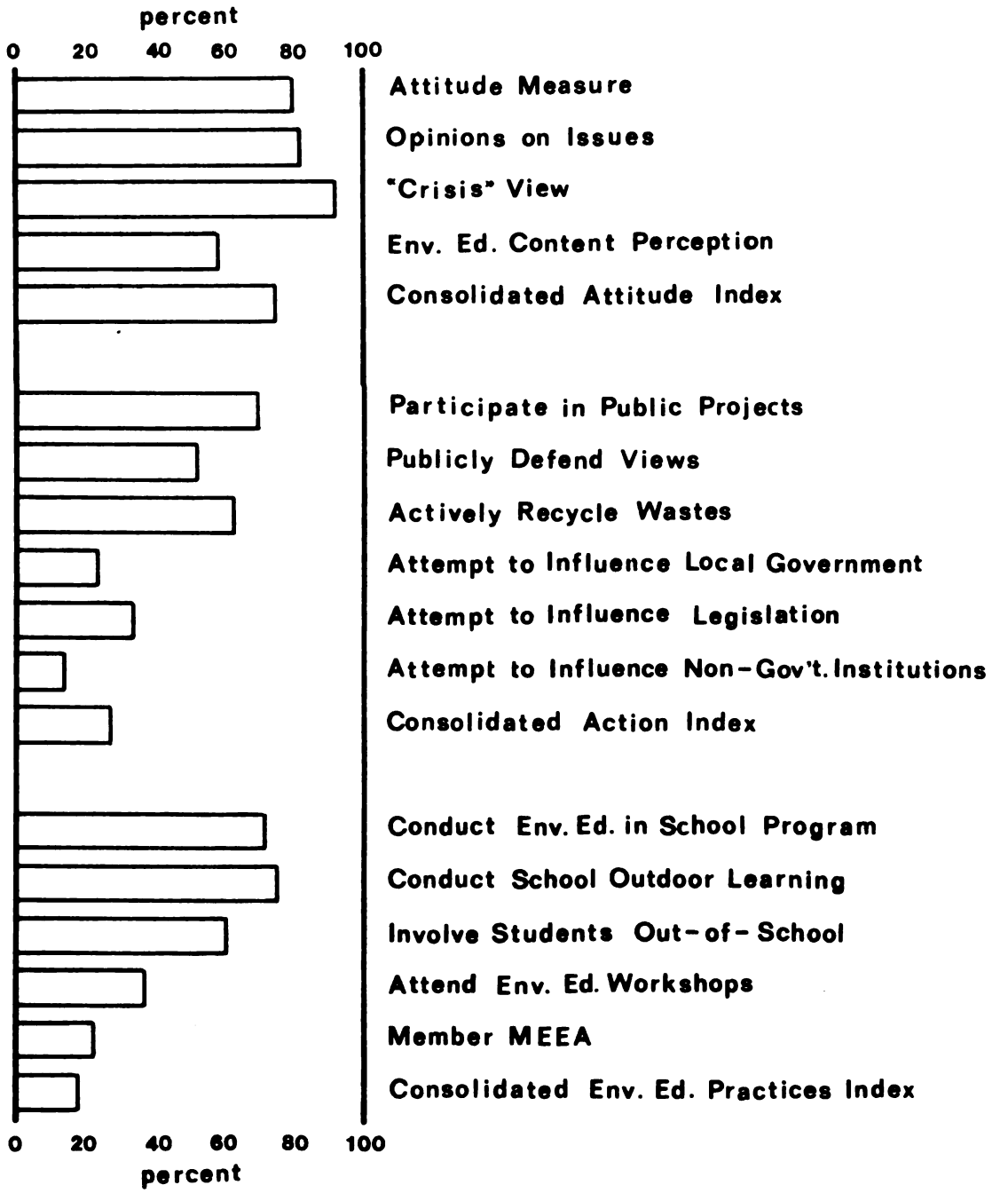


Figure 1. Profile of Environmental Attitudes, Actions, and Environmental Education Practices

Environmental Attitude Profile-- Attitude Measure

The Environmental Attitude Profile shown in Figure 2 is derived from the data presented in Table 2.

The Attitude Measure used in this study was taken from the George study administered in 1965 (George, 1966). A discussion of the George study and related literature is included in Appendix C. The George questionnaire contained 64 items organized into four parts. George describes the four parts as:

> . . . a revision and rearrangement of the testing instrument developed by Laug and later refined by Whiteman. The questionnaire was organized into four parts and color-coded as follows:
>
> Part 1 (white) - Sixteen statements dealing with general attitudes regarding conservation problems, the importance of conservation in our society, and the recognition of what we mean when we see or use the term conservation.
>
> Part 2 (pink) - Sixteen attitudinal statements dealing with conservation problems of our forest resources and wildlife resources. Attention is directed to attitudes concerning management of the resources and to their interrelationships, as well as further recognition of the meaning of conservation and conservation practices.
>
> Part 3 (green) - Sixteen statements related to attitudes toward soil and water resources, the need for conservation practices, and the conservation movement in a democracy, as related to personal freedom and economics.
>
> Part 4 (yellow) - Sixteen attitudinal statements concerning the role of the individual in conservation, as well as general attitudes toward conservation problems, the importance of conservation and what we mean when we use the term conservation.

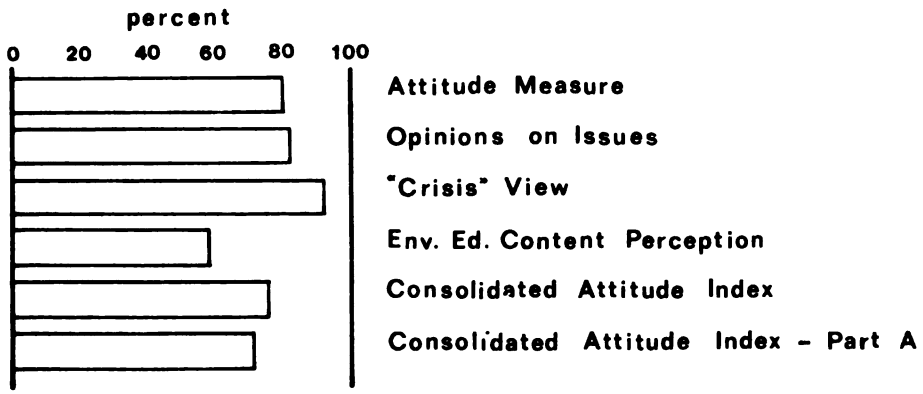


Figure 2. Environmental Attitude Profile

TABLE 2.

ENVIRONMENTAL ATTITUDE PROFILE,
1978 TES TEACHERS

	N	Mean	SD	95% C.I.		Mean adjusted to 100%
				+ or -	%	
Attitude Measure	123	102.30	13.82	2.47	2.4	79.92
Opinions on Issues	123	29.56	4.07	0.73	2.5	82.11
Environmental "Crisis" View	122	2.75	0.47	0.08	3.1	91.80
Environmental Education Content Perception	123	16.17	6.72	1.20	7.4	57.75
Consolidated Attitude Index	123	75.46	10.49	1.87	2.5	75.46
Consolidated Attitude Index Part A	123	71.31	11.75	2.10	2.9	71.31

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. These are identified as Parts A and B in order to avoid confusion or direct interchange with George's Parts 1 and 4. Subsequent analysis indicated that the use of George's Part 1 alone might well have been sufficient and the results have been included in this report for the possible benefit of future researchers.

It is important to describe one major change 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 this in 1978, the word environment has 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). This last, the interaction, is the role formerly filled by the word conservation.

In state-level curriculum considerations for Michigan schools, conservation education has been relegated to a position secondary to and indeed only a part of environmental education (Governor's Task Force, 1973; M.E.E.R.C., 1978). Conservationists have become environmentalists in many of our institutional proceedings. Conservation has gradually come to refer to use of resources within the overall considerations of "the environment." Thus 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.

Item analysis was considered as an attempt to evaluate the effects of this wording change. External validation would then have been necessary (Babbie, 1973). It was decided that these two valuations would not be truly meaningful unless paired questionnaires were administered to paired sample audiences drawn in 1978. As the change effects were not an essential purpose of the study, it was decided that such analyses could be omitted without invalidating the measuring device. There was also some concern that the intensification referred to by George, and subsequently evident in this report, would mask effective item evaluation anyway. The comparative results presented later indicate both deductively and intuitively that the effects are probably minimal.

Scoring procedure for the Attitude Measure followed that of the George study including examples as follows.

> Method of Scoring
>
> In an effort to further explain and identify the nature of the statements, as revised, in each of the four parts of the questionnaire, attention is directed to two sample statements from each part. Associated with each is an example of the method of scoring.
>
> The following examples show the first and eleventh statement for each part of the questionnaire. The underlined response indicates full agreement with a most favorable attitude toward conservation.

Part 1 (white page):
SA-Strongly Agree; A-Agree; U-Undecided; D-Disagree;
SD-Strongly Disagree;

SA A U D SD 1. Progress in our country will be retarded if we use effective conservation measures.

SA A U D SD 11. The subject of conservation just doesn't interest me.

Part 2 (pink page):

SA A U D SD 17. Hunting is very poor conservation.

SA A U D SD 27. When a forest is managed for conservation purposes, it means that no trees should be cut.

Part 3 (green page):

SA A U D SD 33. A man should be allowed to use his land as he sees fit.

SA A U D SD 43. An effective method to bring about conservation measures is to prove to the farmer that they will make the farmer more prosperous.

Part 4 (yellow page):

SA A U D SD 49. 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 59. To practice conservation within the home is too time consuming.

In scoring the questionnaire statements, 4 points are given for each item that is in full agreement with the underlined response. Thus, a participant selecting all the responses as underlined, would receive a total of 32 points for the eight items.

If, for example, the response of Agree (A) was selected for all eight items, the scoring would be one point for each of seven items and 3 points for the item numbered 43, making a total score of 10 points. A response of Undecided (U) is scored with 2 points, being just two steps removed from full agreement with the Strongly Disagree (SD) or Strongly Agree (SA) response, and would give a total score of 16.

The full agreement responses are indicated on the sample questionnaire in Appendix A. The frequency distribution of responses for each statement, numbered 14 through 45 on the 1978 questionnaire, is tabulated in Table 3. 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.

The Attitude Measure contains a total of 32 statements. As each response has a maximum score of four points, the total possible score for the Attitude Measure is 128. A maximum score would then reflect very strong agreement or very strong disagreement with each statement. The midpoint, the Undecided response, chosen throughout would offer a total score of 64.

Scores on the Attitude Measure ranged from a low of 74 to a high of 124. As reported in Table 2, the Mean of 102.30 was accompanied by a Standard Deviation of 13.82. This mean is strongly supported by a Median of 102.40 and an unduplicated Mode of 103. Adjustment of the mean to a base of 100 gives the mean percentage score of 79.92. This score is in keeping with the self-selection for interest in the subject area.

Distribution of scores throughout the range was very broad, producing a rather flat distribution curve, thus departing considerably from a normal distribution as indicated by a kurtosis of 23.7. This was the first indication that

TABLE 3.

RESPONSES TO ATTITUDE MEASURE STATEMENTS--
FREQUENCY DISTRIBUTION

Statement Number	Favorability Percent (N=122)					Mean Score
	Very Low	Low	Med.	High	Very High	
14	4.1	18.0	5.7	43.4	28.7	2.75
15	.8	1.6	. . .	16.4	81.1	3.75
16	1.6	14.8	22.1	29.5	32.0	2.75
17	.8	4.1	9.0	53.3	32.8	3.13
18	.8	7.4	8.2	47.5	36.1	3.11
19	.8	5.7	10.7	50.0	32.8	3.08
20	1.6	9.8	1.6	45.1	41.8	3.16
21	.8	9.0	4.9	52.5	32.8	3.07
22	1.6	4.1	9.8	53.3	31.1	3.08
23	1.6	8.2	13.1	54.9	22.1	2.88
24	. . .	. . .	.8	34.4	64.8	3.64
25	. . .	3.3	9.8	51.6	35.2	3.19
26	. . .	7.4	9.0	51.6	32.0	3.08
27	.8	2.5	4.1	63.1	29.5	3.18
28	7.4	9.0	14.8	45.9	23.0	2.68
29	. . .	. . .	. . .	27.0	73.0	3.73
30	. . .	. . .	.8	27.0	72.1	3.71
31	.8	2.5	1.6	50.0	45.1	3.36
32	. . .	2.5	2.5	70.5	24.6	3.17
33	. . .	4.1	. . .	41.0	54.9	3.47
34	. . .	1.6	4.1	60.7	33.6	3.26
35	. . .	3.3	4.9	67.2	24.6	3.13
36	. . .	.8	4.1	65.6	29.5	3.24
37	. . .	. . .	. . .	27.9	72.1	3.72
38	1.6	.8	1.6	45.9	50.0	3.42
39	1.6	.8	23.0	51.6	23.0	2.93
40	. . .	.8	.8	58.2	40.2	3.38
41	.8	4.1	8.2	55.7	31.1	3.12
42	.8	1.6	5.7	67.2	24.6	3.13
43	.8	1.6	4.1	62.3	31.1	3.21
44	. . .	4.1	6.6	62.3	27.0	3.12
45	.8	.8	4.1	36.9	57.4	3.49

what might have been anticipated to be a fairly homogeneous group would prove to be quite heterogeneous.

In addition to its use as an established instrument for measuring attitudes of groups such as TES Teachers, the Attitude Measure was intended to be used to compare the similar group measured in the 1965 George study.

The 1965 group was described as ". . . teachers and leaders who had not had the conservation workshop experience." (George, 1966, p. 36) This group, upon entry to the workshop, would be directly comparable to the 1978 TES workshop group.

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." (George, 1966, pp. 36-7) These persons would then complete George's attitude survey. This group offered an unusual opportunity for comparison and for testing the discriminatory ability of the attitude measuring instrument. Although the no-workshop teachers had not self-selected for interest nor committed themselves to workshop attendance, it is reasonable to assume that those completing the questionnaire and returning it would be likely candidates for subsequent workshop attendance. This assumption is supported by the Table 4 data which indicates that colleague influence was the dominant factor in 1978 TES attendance.

TABLE 4.

TES ATTENDANCE INFLUENCE, 1978

Influence	% selecting (N=122)
Colleagues	48.4
Scholarship availability	27.0
Meeting academic requirements	24.6
Other	15.6
Mailed notice	12.3
Newsletters	10.7
Administrative encouragement	5.7

While not a control group in the customary sense, the no-workshop group offers a tighter control for discriminating between those who might attend and those who actually do attend. If the no-workshop group scores are lower than both of the other group scores, there is then a strong suggestion that the Attitude Measure is a valid instrument, measuring what it is purported to measure.

In addition to simple descriptive statistics, comparative analyses were performed using basic inferential procedures. To determine if a difference between two mean scores was statistically significant, the null hypothesis of equality and Student's t tests were applied. As the published George data was properly concerned with the overall test instrument rather than its parts, variances for the several sections were not included. Therefore a reasonable procedure

for comparison was devised and t calculations were then performed. A description of this procedure and its rationale are included in Appendix D. The results of these comparative analyses are presented in Table 5.

Additionally, employees of the Department of Natural Resources were measured both in 1978 and in 1965 so that comparative analyses of these groups were also made and are shown in Table 6.

The Department of Natural Resources was known in 1965 as the Conservation Department with a somewhat narrower range of responsibilities. The possible effects of this are noted later. Unfortunately, the 1965 group offered no DNR no-workshop comparison. However, certain intuitive interpretations may be tentatively made by comparing the two data arrays for Teachers and DNR employees.

It would appear that attitudes of 1978 TES Teachers as measured with this instrument are significantly different statistically from those of 1965 TES teachers in both groups. This difference may be viewed as not very great with only modest significance. Because of the uncertainty of the statistical base, it is quite possible that a Type I Error would occur if the null hypothesis of equality were rejected, however. Therefore it is reasonable to assert only that the 1978 population showed an increase in score of 2.83 points over a 1965 population of teachers without workshop experience, an increase of 2.8 percent, and a decrease of 2.46 points below a 1965 population of teachers immediately after

TABLE 5.

TEACHER MEAN ATTITUDE SCORE COMPARISON, 1965 TO 1978

	N	A + B Mean	A + B SD	1965 none to 1965 entry	1965 entry to 1978 entry	1965 none to 1978 entry
1965 teachers without workshop	95	99.47	8.64			
1965 teachers at entry	241	104.76	9.27	+ 5.29		
1978 teachers at entry	123	102.30	13.82		- 2.46	+ 2.83
pooled variance, proportioned SD				82.76	121.34	140.36
sample mean difference				1.10	1.22	1.62
degrees of freedom				334.	362.	216.
t value, proportioned SD				4.81	- 2.02	1.75
significance				0.01	0.05	0.10
pooled variance, 1965 SD equal to 1978 SD				190.99	190.99	190.99
sample mean difference				1.67	1.53	1.89
degrees of freedom				334.	362.	216.
t value, 1965 SD equal to 1978 SD				3.17	- 1.61	1.50
significance				0.01	0.20	0.20

| | | |

TABLE 6.

DNR MEAN ATTITUDE SCORE COMPARISON, 1965 TO 1978

	N	A + B Mean	A + B SD	1965 entry to 1978 entry
1965 DNR at entry	66	105.81	8.47	
1978 DNR at entry	28	97.04	8.36	- 8.77
pooled variance, proportioned SD				71.20
sample mean difference				1.90
degrees of freedom				92.
t value, proportioned SD				- 4.62
significance				0.01
pooled variance, 1965 SD equal to 1978 SD				69.89
sample mean difference				1.89
degrees of freedom				92.
t value, 1965 equal to 1978 SD				- 4.64
significance				0.01

arrival at the TES, a decrease of 2.3 percent. However, the score differences do indicate that the Attitude Measure as administered is a valid instrument with continuing utility for comparative purposes.

The DNR employees show a marked decrease, using this measuring instrument, which is statistically very significant even if the derived values lack somewhat in desired accuracy. The two groups are not wholly comparable. The scope of the Department of Natural Resources expanded along with its change in name from Conservation Department. The broader range of activities doubtless affected the personnel characteristics. A sampling of all personnel, although emphasizing field employees, attends the TES. There is also some likelihood that the occasional change in terminology from "conservation" to "environment" may have had a greater effect on the employees of the Department of Natural Resources than it did on the Teachers.

By using the Teachers data as a reference framework, one might infer with confidence that Conservation Department employees entered the 1965 workshop experience with not only higher attitude scores but also more strongly held attitudes than did the 1978 group, a decline during the period of about 8.3 percent.

Despite the unavoidable weaknesses of this comparative analysis, the Attitude Measure offers a base line reference for measurement and comparison of subsequent TES groups.

The first operational proposition, Assumption 1, stated that: An existing attitude measuring instrument will reliably measure the environmental attitudes of teachers who have self-selected for their interest in environmental education. The analysis of comparative data indicates that the measuring instrument used in this survey may be expected to measure attitudes in a consistent manner. There is insufficient comparative data available to indicate conclusively that the instrument will reliably show differences between groups; there may in fact be little real difference between the two entry groups measured. The high kurtosis of the frequency distribution showing a broad and fairly flat curve may suggest a weak instrument. However, the SD of the mean would suggest that the instrument is not at fault but rather that the total population measured is more heterogeneous than homogeneous in its attitudes with the instrument remaining a reasonable measure of the individual's attitudes. The validity of the instrument is partially confirmed by comparisons of the three groups.

Perusal of the literature, as reviewed by George and subsequent material by this researcher, would indicate that this attitude measuring instrument is at least adequately effective for similar populations and has the special virtue of offering a reasonably sound comparison through an important time span.

Hypothesis 5 stated: There is no significant difference in attitudes between the selected population of 1978 and

a similar population of 1965. The comparative data in Table 5 indicates that assumption of a statistically significant difference is untenable. The change in raw score value of less than 2.5 percent is insufficient to be considered important.

Many workers in environmental education assume that those, including teachers, living in high-density population areas have quite different attitudes toward environmental matters from those living in lower population density areas. (Bettinghaus, 1977; Bozardt, 1976; Murch, 1971) Often these differences are referred to as urban versus rural. A grouping commonly expressed when one makes more detailed inquiry is "city-suburb" versus "small town-country." Support for this latter grouping is found later in this report on page 93. Data in this study were frequently analyzed to determine if in fact there were statistical differences between the high-density dwellers and the low-density dwellers.

In the Attitude Measure, comparison of the 1978 TES Teachers divided into high and low density groups reveals no statistically significant differences, according to t-test procedures, even when the two parts of the Measure are treated separately. One point that may be made as a result of this comparison is that there is considerably less individual variation within the "rural" population of TES Teachers than within the "urban." This data is presented in Table 7.

TABLE 7.

ENVIRONMENTAL ATTITUDE PROFILE--
"URBAN" vs "RURAL" ATTITUDES

	Density (cases)	Mean	SD	95% C.I.		F	p	df	t	p	Sig.
				+ or -	%						
ATTITUDE MEASURE Total Score	Hi (62) Lo (58)	102.29 102.57	17.12 8.99	4.35 2.36	4.3 2.3	3.63	.000	93.5	-.11	.911	N.S.
ATTITUDE MEASURE Part Score A	Hi (62) Lo (58)	49.77 50.12	9.00 5.23	2.29 1.38	4.6 2.7	2.96	.000	99.1	-.26	.796	N.S.
ATTITUDE MEASURE Part Score B	Hi (62) Lo (58)	52.52 52.45	8.64 4.70	2.19 1.23	4.2 2.4	3.39	.000	95.4	.05	.957	N.S.

N.S. = Not Significant

It was considered desirable to explore simplification of the total measuring instrument to reduce the time necessary for future respondents to complete it. Bivariate correlation procedures were conducted to determine if the first half of the Attitude Measure (Part A, George's Part 1) or the last half (Part B, George's Part 4) might substitute for the 32 item Measure. Pearson's r correlations indicate, as shown in Table 8, that either Part might well take the place of the whole. Perusal of the frequency distributions in Table 3 and the scattergrams for the two correlations lead this researcher to recommend that, should the Attitude Measure be shortened, Part A would offer more useful distributions of responses than Part B.

TABLE 8.

ATTITUDE MEASURE--BIVARIATE CORRELATION
OF PARTS A AND B

Pearson product-moment correlation (N=123)		
Part Score A with Total Score	Pearson's r	0.9589
	r^2	0.9195
	significance of r	0.00001
	Standard Error of estimate	2.1088
Part Score B with Total Score	Pearson's r	0.9545
	r^2	0.9110
	significance of r	0.00001
	Standard Error of estimate	2.1088
Part Score A with Part Score B	Pearson's r	0.8306
	r^2	0.6899
	significance of r	0.00001
	Standard Error of estimate	4.1384

Environmental Attitude Profile--MPOS

Although this study was centered on a particular group of teachers, the availability of data sampling the entire citizenry of the state of Michigan offered an opportunity to compare the study group with Michigan citizens in general. The TES Teachers are a part of the total Michigan citizenry and experience an affect and behavior interchange with others in their communities. The question posed was: Do these teachers hold environmental attitudes especially different from the general population and, if so, in what way?

"The Michigan Public Opinion Survey was undertaken to determine how Michigan residents feel about a variety of community issues . . . "(Kimball, et al., 1977, p. 1). The Michigan Public Opinion Survey (MPOS) was mailed to 21,792 randomly selected Michigan households in late 1975. The questionnaire was to be completed by one adult from each household. Usable responses totalled 13,296, a response of 68 percent, and the statistical error tolerance of the data is less than one percent. The MPOS may be considered a representative sample of Michigan citizens.

Of the 55 content items categorized in the MPOS, 12 were selected for inclusion in this study. These 12 included all of the items, eight, which related in a straightforward fashion to environmental problems and which it would be expected most respondents would so identify either

directly or indirectly. Additionally, four items from the MPOS were included which related to perceptions of community spirit and would be expected to reflect the willingness of a community to undertake action to improve its own habitat.

It was expected that the TES Teachers groups would consider these topics to be generally more serious problems than would an average population sample of the state. Further, it was expected that, although responses would differ in intensity, the relative perceived seriousness of problems would probably follow the same pattern. In other words, a problem seen as SERIOUS by a TES group might be seen as MODERATE by the MPOS sample. A problem seen as MODERATE by a TES group might be seen as NOT a problem by the state-wide sample. The basis for this expectation lay in the self-selective nature of the TES groups. Teacher attendance at a learning session in environmental education demonstrates a concern for the problems and solutions of environmental matters which is probably accompanied by increased intensity of problem ranking. The inherent nature of the TES groups was expected to show a response-difference in degree but not necessarily in between-item relationships when compared to the MPOS sample population.

The composite score distribution for TES Teachers is displayed in Figure 3 with individual item score distribution arrayed in Table 9. Figure 4 displays the composite score distribution for the DNR employees. The similarity between the two groups is particularly striking.

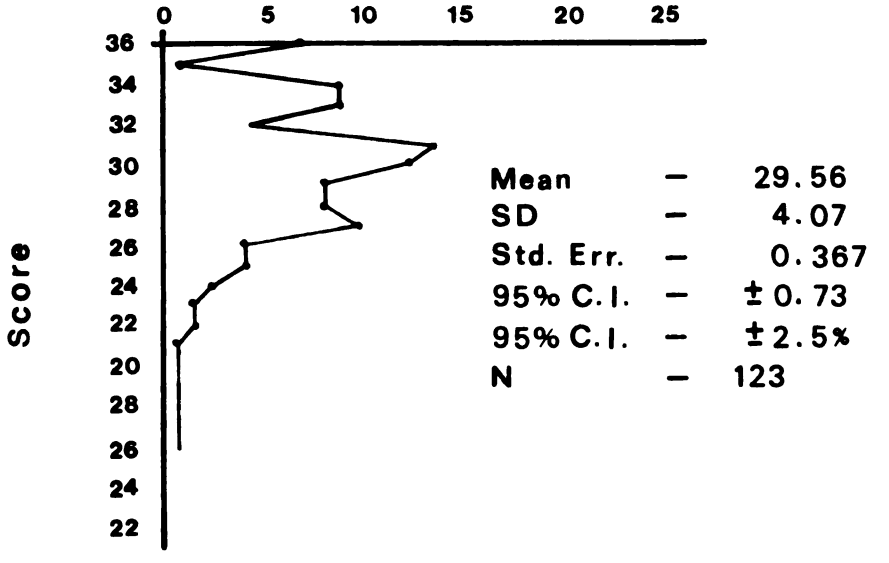


Figure 3. MPOS Environmental Topics -- 1978 TES Teachers Composite Score Distribution

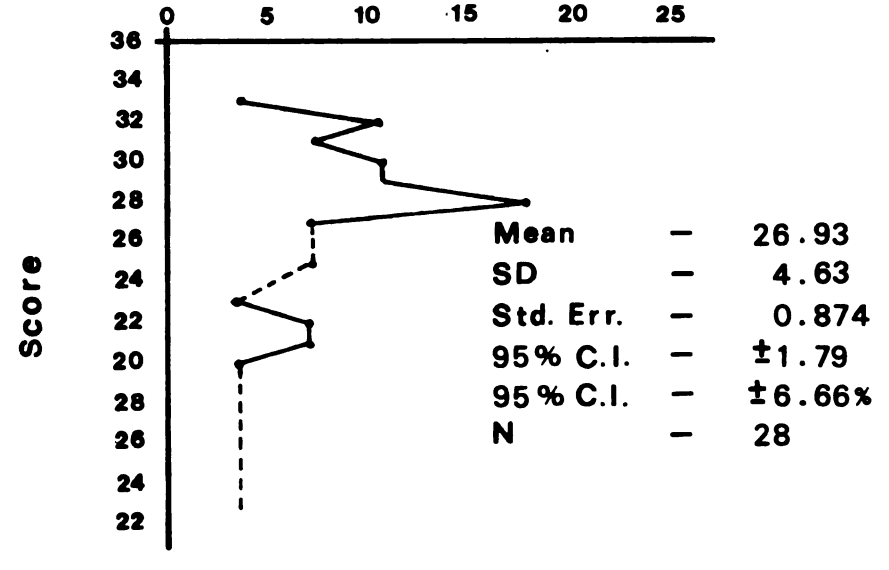


Figure 4. MPOS Environmental Topics -- 1978 TES DNR Employees Composite Score Distribution

TABLE 9.

MPOS ENVIRONMENTAL TOPICS--1978 TES TEACHERS
Score Distribution by Percent

(N=123)	NOT a Problem	SLIGHT Problem	MODERATE Problem	SERIOUS Problem
Air Pollution	0.0	3.3	23.6	73.2
Water Pollution	0.0	0.8	11.4	87.8
Water and Sewage Treatment Facilities	0.0	4.1	32.5	63.4
Trash and Garbage Collection and Disposal	0.0	8.9	43.1	48.0
Land Use Conflicts	0.8	6.5	39.8	52.0
Citizen Participation in Community Decisions	2.4	15.4	49.6	32.5
People Willing to Work for Good of Community	4.9	16.3	42.3	36.6
Community Planning	0.0	15.4	56.9	27.6
Community Spirit and Pride	4.9	26.8	45.5	22.8
Energy Cost	0.0	3.3	16.3	80.5
Energy Supply	0.8	2.4	11.4	84.6
Unnecessary Energy Use	0.0	4.1	10.6	85.4

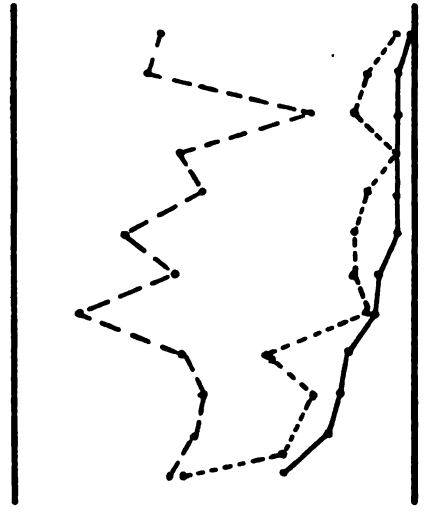
The comparison of special interest is shown in Figure 5 and it is this latter which will be discussed here.

The topics in Figure 5 are arranged, not as they were presented in the questionnaire, but in a descending hierarchy as the Teachers viewed them as serious problems. No attempt was made to distinguish between the attitude that "we should do something to correct the problem" and the attitude that "we're doing too much and that's the problem" since such distinctions were not made in the published MPOS survey. The response only indicates perception as "a problem" to be dealt with in some fashion.

In Figure 5 the responses of MODERATE and SERIOUS have been collapsed into a single value for the Teachers since this method was used for the MPOS. Although this data collapse sacrifices accuracy, it is sufficient for present comparison.

As anticipated, the Teachers saw the selected problems as more serious than did the general citizenry of the state. Although there appears to be a similarity in the trends of the lines, care must be exercised since this is an artificial ranking and an apparent trend may well be an anomaly of the technique.

Also, a general caution is in order regarding the patterns in citizen responses. Several of the MPOS questions and responses may have been influenced by the source of the survey. Note that it is the Michigan Public Opinion Survey, that it is introduced as statewide, conducted by the



Topic by Teacher Ranking	percent Citizens	DNR	Teachers
Water Pollution	37	96	99
Air Pollution	34	89	97
Energy Cost	75	86	97
Energy Supply	43	96	96
Unnecessary Energy Use	48	89	96
Water & Sewage Facilities	29	86	96
Land Use Conflicts	41	86	92
Trash and Garbage Disposal	17	89	91
Community Planning	43	64	84
Citizen Participation in Decisions	48	75	82
People Willing to Work	46	68	79
Community Spirit & Pride	40	43	68

— — • — — 13,296 Michigan Citizens, late 1975
----•---- 28 DNR Employees entering TES, mid-1978
——•—— 123 Michigan Teachers entering TES, mid-1978

Figure 5. MPOS Environmental Topics -- Michigan Citizens, TES Teachers, and DNR Employees

Department of Resource Development (a name easily associated or confused with the state Department of Natural Resources) of Michigan State University, and questions about Public Spending Needs are included in the MPOS. Respondents may well have viewed some of the problems as potential imposition of additional taxes and state government control. At the time of the MPOS distribution, there was considerable publicity about State Land Use Planning and much opposition to state interference in local affairs was being vocalized, especially in non-industrial communities.

Nonetheless, there are two comparisons of special interest: energy and community activity. The TES Teachers viewed the three aspects of energy--cost, supply and use--as equally serious. Michigan citizens as a whole disagreed. The most ready interpretation is that the Teachers were better informed about declining energy supplies and the role unnecessary energy use plays. The MPOS was answered by adults. With many environmental education programs focused on the problems of energy, it may be possible that youngsters and their teachers are better informed than the parents.

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Environmental Attitude Profile-- "Crisis" View

It was posited during questionnaire construction that there would be a difference in the view toward the seriousness of a problem when that problem is narrowly identified and when it is broadly described. Therefore, a rating question was posed concerning the overall view of the TES Teachers toward environmental problems in general:

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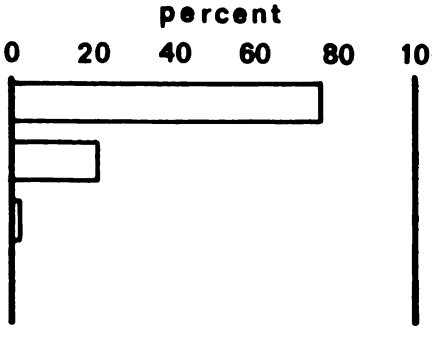

perception	percent	value code
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MODERATE Problem	21.3	2
SLIGHT Problem	1.6	1
NO Problem	0.0	0

Ranking Value: Mean = 2.754; SD = 0.469; 95% C.I. = ± 0.084, 3.1%

Figure 6. Environmental "Crisis" View

By referring to Figure 2, page 54, one may see that this generalized question received a strong response noticeably exceeding the scores on the Attitude Measure and the collection of MPOS issues. With the items concerning communities excluded from the MPOS list, there is a closer correspondence, the specifically identified issues of the MPOS then scaling 95.5.

In reviewing the statements of the Attitude Measure, one will find many which call for a response based on expression of a personal value system. The "crisis" view question avoids this problem. It appears that these Teachers' general view of environmental problems is not yet fully supported by adjustments of their personal values.

There is, in this comparison of Attitude Measure, MPOS issues and general view, support for the contention that identified issues receive stronger opinion response than generalized statements. Yet this comparison also demonstrates that response strength varies significantly when expression of the respondent's personal value system is involved. This is in accord with Schoenfeld's discussion of filters (1975, p. 23) emphasizing attitude reversal potential as a result of the personal-value impact. It also exemplifies the potential effects of cognitive dissonance on environmental problem evaluation as discussed by Feather (1963), with a conflict between simplistic idealism and personal human involvement in the problem as noted by Murch (1971, discussed by Sellers and Jones, 1973, p. 54).

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This, then, poses a further question: If these individuals with strong views about the seriousness of environmental problems have such modest influence upon their families, can they be expected to have a strong influence on their students? Hess and Torney (1968, p. 15) make the point that:

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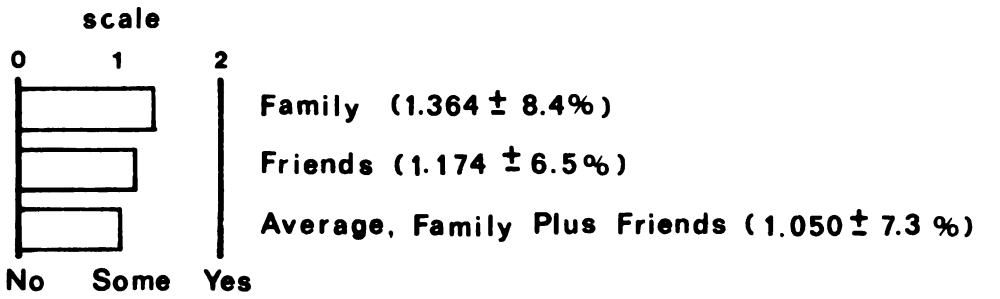

Figure 7. Mean Agreement of Friends and Family

TABLE 10.

AGREEMENT OF FRIENDS AND FAMILY

(N=121)		Family			Friends Totals
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There has often been difficulty with attempts at the definition of environmental education, among teacher groups as well as others. Stapp, et al., in 1971, emphasized the biophysical environment. Many others, both before and after, have also emphasized the biological and physical aspects of the earth as the central focus of education about the environment. Development of the environmental concept in other disciplines such as sociology and economics has led advocates of environmental conservation such as George (1979) to adopt a view of holism, that environmental education has a reality independent of and greater than the sum of its parts. In 1973, the Michigan Department of Education described a nearly holistic approach to environmental education.

> The more appropriate approach, however, is for environmental concepts to be integrated throughout the curriculum, emphasizing man's total environment. While terms such as "conservation education," "outdoor education," and "nature study" are used by some educators, environmental education is more than this. It is a process. It is learning how to deal with environmentally associated problems. Environmental education is interdisciplinary, with its content drawn from all fields--the humanities, social sciences, economics, psychology, the biological and physical sciences, etc. 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.)

It was considered especially desirable to determine the perceptions of the 1978 Teachers' Environmental School teachers as to the content of environmental education. To arrive at some determination of the scope perceived by the

TES Teachers, the list of topics in item 1 of the questionnaire was synthesized. The specific subject titles selected were derived from several sources (see Appendix E). These listings often used broad titles such as "social sciences," phrases such as "cultural and economic dimensions," clauses and whole sentences 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 area listing was subjectively correlated with listings of academic and non-academic subject titles from several local school districts, intermediate school districts, community colleges and universities. The distinctions between subject areas were sometimes difficult to draw and are to that extent arbitrary. In the end, the topics were titled as the researcher anticipated they would be distinct in the minds of the respondents. The resultant school-subject list is considered representative of the range of subjects readily identifiable by most educational institutions and teachers and included by state, national and international organizations within the scope of environmental education.

Response to such a list does not, of course, measure holistic perception. It does, however, measure a perceived scope of environmental education and thus the potential for a holistic view.

The percentage of individual Teachers including each topic in their perception of the scope of environmental education is presented in Figure 8. The listing is by descending rank. The average of somewhat more than half of the topics offered was heavily weighted by those who selected all 28 topics.

For a more useful representation of the distribution, an inclusion density histogram was developed and is presented in Figure 9. From this it can be seen that the second most popular number of topics included within the scope of environmental education was 12. The obvious conclusion is that, although 13 percent of these Teachers view environmental education as encompassing all subject areas, most have a very unholistic view.

With the appearance in Figure 9 of a second distributional mode, it seemed desirable to determine if there was some consistency in the topics selected at this level--perhaps there might be a "threshold" of holism perception potential. Topic popularity was explored at the mode 12. To accommodate minor differences which would be expected, modes 11 and 13 were also analyzed to determine a range for each topic. The results are displayed graphically in Figure 10.

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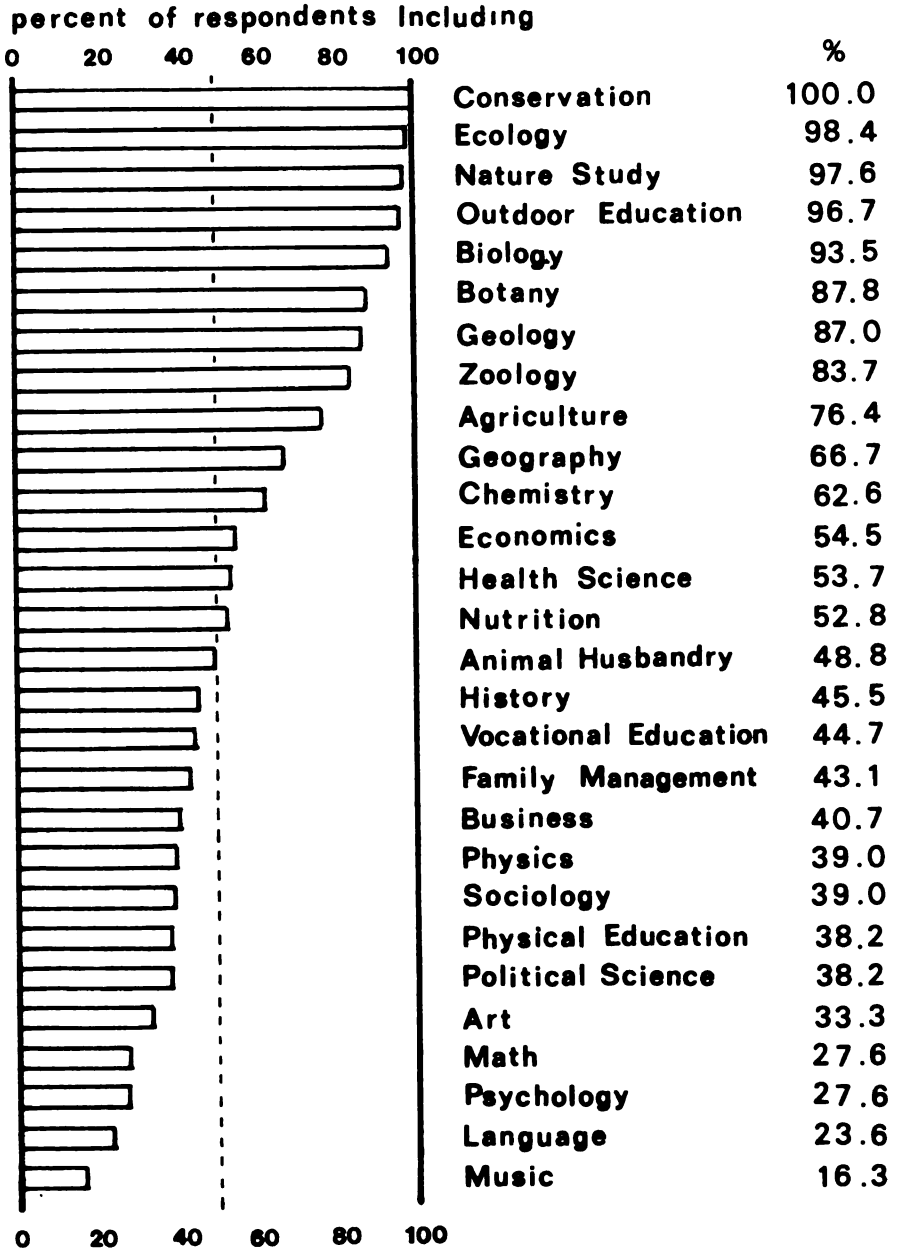


Score – Maximum 28 (N=123)

Mean – 16.17 Range 4 to 28

S D – 6.72 95% C.I. ± 7.4 %

Figure 8. Perceived Content By Topic

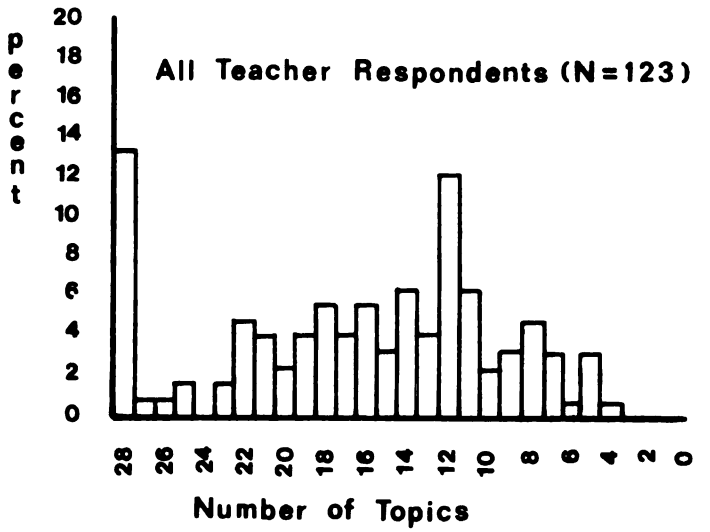


Figure 9. Perceived Content Inclusion Density

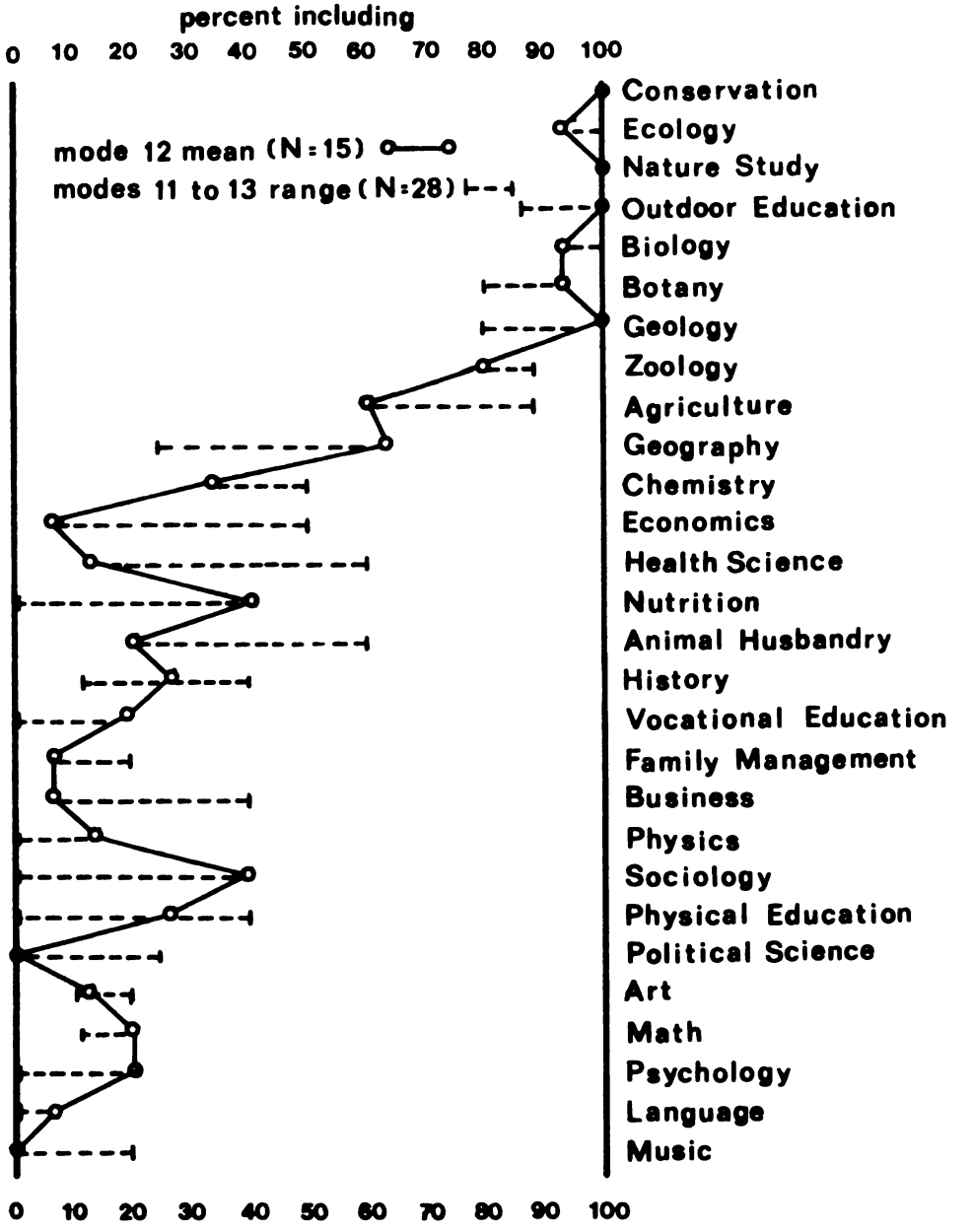


Figure 10. Perceived Content Topic Popularity

TABLE 8.

ATTITUDE MEASURE--BIVARIATE CORRELATION
OF PARTS A AND B

Pearson product-moment correlation (N=123)		
Part Score A with Total Score	Pearson's r	0.9589
	r^2	0.9195
	significance of r	0.00001
	Standard Error of estimate	2.1088
Part Score B with Total Score	Pearson's r	0.9545
	r^2	0.9110
	significance of r	0.00001
	Standard Error of estimate	2.1088
Part Score A with Part Score B	Pearson's r	0.8306
	r^2	0.6899
	significance of r	0.00001
	Standard Error of estimate	4.1384

Environmental Attitude Profile-- MPOS

Although this study was centered on a particular group of teachers, the availability of data sampling the entire citizenry of the state of Michigan offered an opportunity to compare the study group with Michigan citizens in general. The TES Teachers are a part of the total Michigan citizenry and experience an affect and behavior interchange with others in their communities. The question posed was: Do these teachers hold environmental attitudes especially different from the general population and, if so, in what way?

"The Michigan Public Opinion Survey was undertaken to determine how Michigan residents feel about a variety of community issues . . . "(Kimball, et al., 1977, p. 1). The Michigan Public Opinion Survey (MPOS) was mailed to 21,792 randomly selected Michigan households in late 1975. The questionnaire was to be completed by one adult from each household. Usable responses totalled 13,296, a response of 68 percent, and the statistical error tolerance of the data is less than one percent. The MPOS may be considered a representative sample of Michigan citizens.

Of the 55 content items categorized in the MPOS, 12 were selected for inclusion in this study. These 12 included all of the items, eight, which related in a straightforward fashion to environmental problems and which it would be expected most respondents would so identify either

directly or indirectly. Additionally, four items from the MPOS were included which related to perceptions of community spirit and would be expected to reflect the willingness of a community to undertake action to improve its own habitat.

It was expected that the TES Teachers groups would consider these topics to be generally more serious problems than would an average population sample of the state. Further, it was expected that, although responses would differ in intensity, the relative perceived seriousness of problems would probably follow the same pattern. In other words, a problem seen as SERIOUS by a TES group might be seen as MODERATE by the MPOS sample. A problem seen as MODERATE by a TES group might be seen as NOT a problem by the state-wide sample. The basis for this expectation lay in the self-selective nature of the TES groups. Teacher attendance at a learning session in environmental education demonstrates a concern for the problems and solutions of environmental matters which is probably accompanied by increased intensity of problem ranking. The inherent nature of the TES groups was expected to show a response-difference in degree but not necessarily in between-item relationships when compared to the MPOS sample population.

The composite score distribution for TES Teachers is displayed in Figure 3 with individual item score distribution arrayed in Table 9. Figure 4 displays the composite score distribution for the DNR employees. The similarity between the two groups is particularly striking.

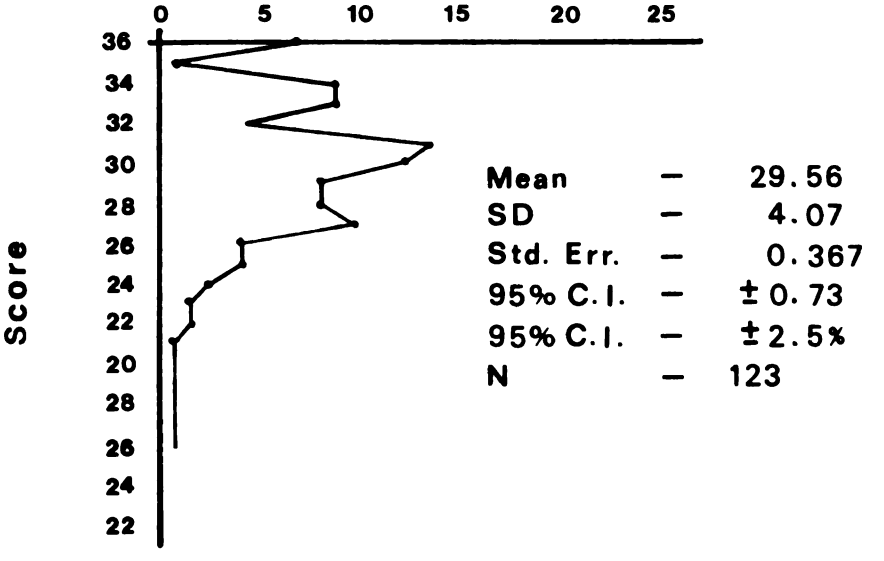


Figure 3. MPOS Environmental Topics -- 1978 TES Teachers Composite Score Distribution

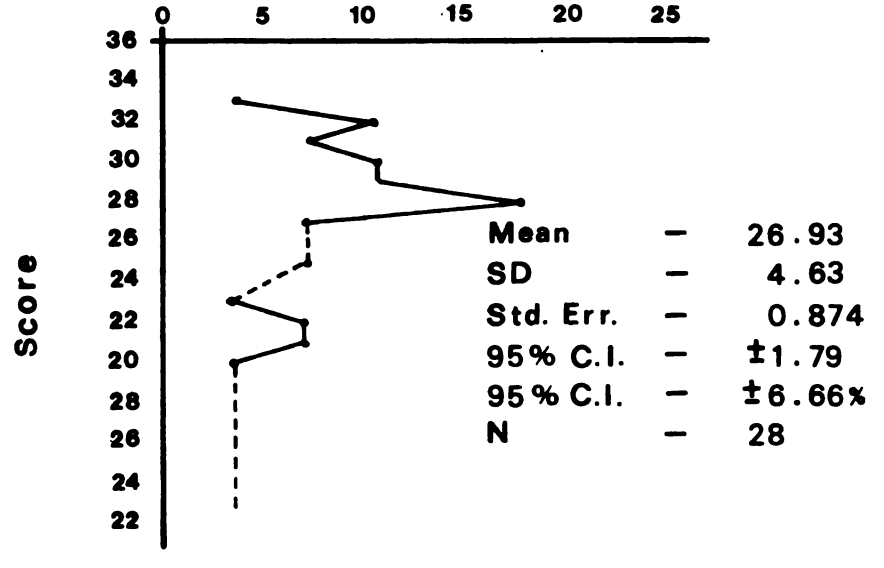


Figure 4. MPOS Environmental Topics -- 1978 TES DNR Employees Composite Score Distribution

TABLE 9.

MPOS ENVIRONMENTAL TOPICS--1978 TES TEACHERS
Score Distribution by Percent

(N=123)	NOT a Problem	SLIGHT Problem	MODERATE Problem	SERIOUS Problem
Air Pollution	0.0	3.3	23.6	73.2
Water Pollution	0.0	0.8	11.4	87.8
Water and Sewage Treatment Facilities	0.0	4.1	32.5	63.4
Trash and Garbage Collection and Disposal	0.0	8.9	43.1	48.0
Land Use Conflicts	0.8	6.5	39.8	52.0
Citizen Participation in Community Decisions	2.4	15.4	49.6	32.5
People Willing to Work for Good of Community	4.9	16.3	42.3	36.6
Community Planning	0.0	15.4	56.9	27.6
Community Spirit and Pride	4.9	26.8	45.5	22.8
Energy Cost	0.0	3.3	16.3	80.5
Energy Supply	0.8	2.4	11.4	84.6
Unnecessary Energy Use	0.0	4.1	10.6	85.4

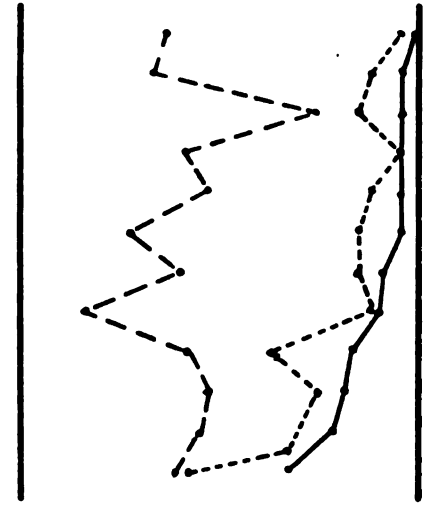
The comparison of special interest is shown in Figure 5 and it is this latter which will be discussed here.

The topics in Figure 5 are arranged, not as they were presented in the questionnaire, but in a descending hierarchy as the Teachers viewed them as serious problems. No attempt was made to distinguish between the attitude that "we should do something to correct the problem" and the attitude that "we're doing too much and that's the problem" since such distinctions were not made in the published MPOS survey. The response only indicates perception as "a problem" to be dealt with in some fashion.

In Figure 5 the responses of MODERATE and SERIOUS have been collapsed into a single value for the Teachers since this method was used for the MPOS. Although this data collapse sacrifices accuracy, it is sufficient for present comparison.

As anticipated, the Teachers saw the selected problems as more serious than did the general citizenry of the state. Although there appears to be a similarity in the trends of the lines, care must be exercised since this is an artificial ranking and an apparent trend may well be an anomaly of the technique.

Also, a general caution is in order regarding the patterns in citizen responses. Several of the MPOS questions and responses may have been influenced by the source of the survey. Note that it is the Michigan Public Opinion Survey, that it is introduced as statewide, conducted by the



Topic by Teacher Ranking	percent Citizens	DNR	Teachers
Water Pollution	37	96	99
Air Pollution	34	89	97
Energy Cost	75	86	97
Energy Supply	43	96	96
Unnecessary Energy Use	48	89	96
Water & Sewage Facilities	29	86	96
Land Use Conflicts	41	86	92
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Community Planning	43	64	84
Citizen Participation in Decisions	48	75	82
People Willing to Work	46	68	79
Community Spirit & Pride	40	43	68

— • — 13,296 Michigan Citizens, late 1975
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Figure 5. MPOS Environmental Topics -- Michigan Citizens, TES Teachers, and DNR Employees

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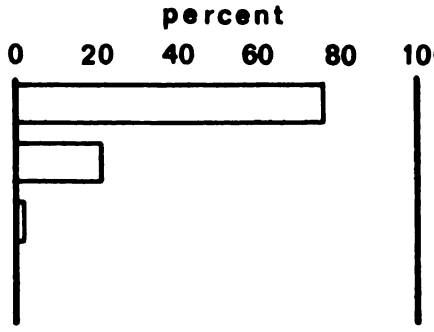

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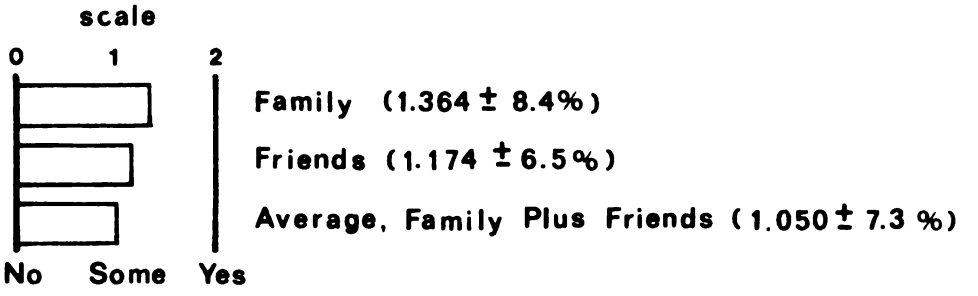

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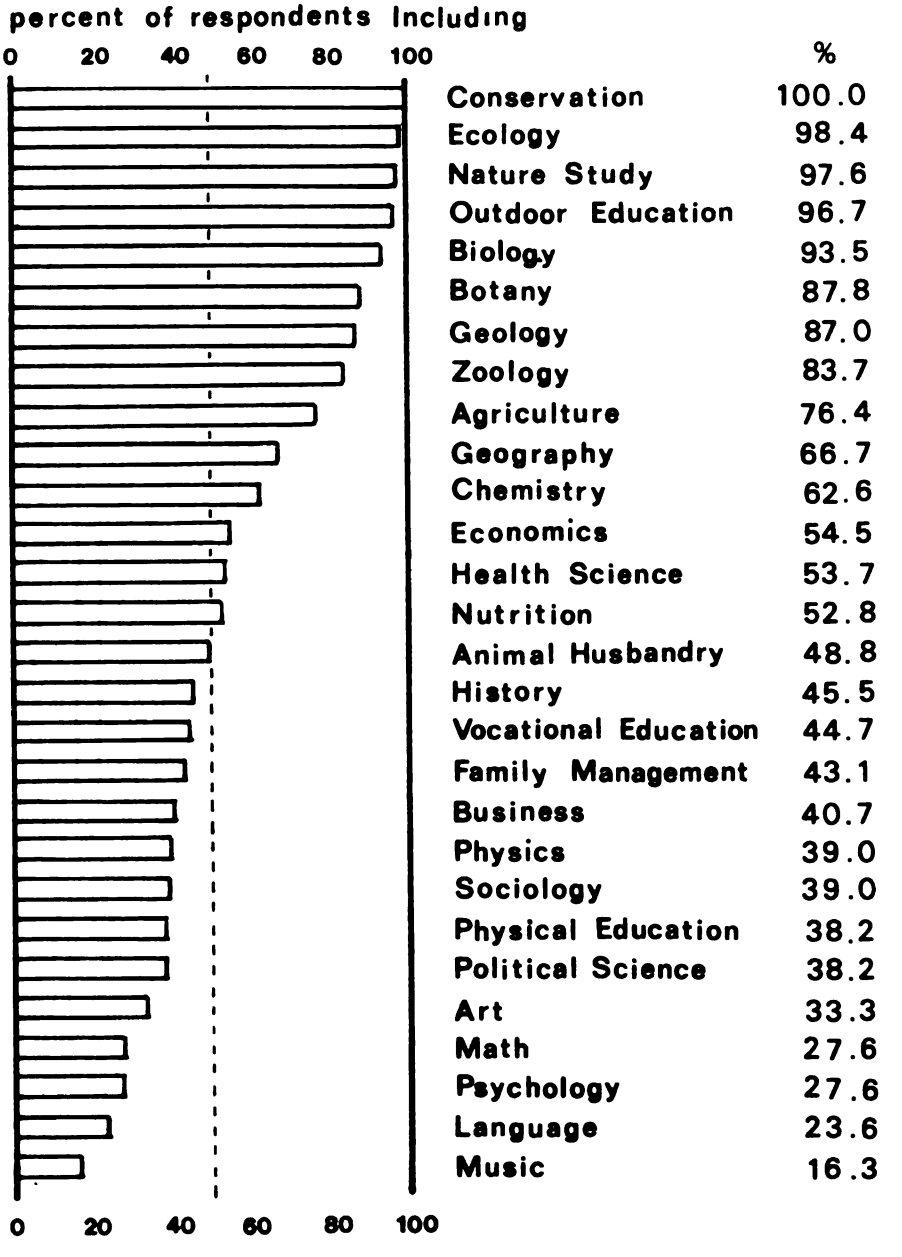
With the appearance in Figure 9 of a second distributional mode, it seemed desirable to determine if there was some consistency in the topics selected at this level--perhaps there might be a "threshold" of holism perception potential. Topic popularity was explored at the mode 12. To accommodate minor differences which would be expected, modes 11 and 13 were also analyzed to determine a range for each topic. The results are displayed graphically in Figure 10.

Although there is some degree of consistency in the "top 8" choices, subsequent variation in topic selections is widely distributed. Even in the top 8 there is notable variability. The small number of respondents precludes projection of these latter findings to a larger population.



Score — Maximum 28 (N=123)

Mean — 16.17 Range 4 to 28

S D — 6.72 95% C.I. ± 7.4 %

Figure 8. Perceived Content By Topic

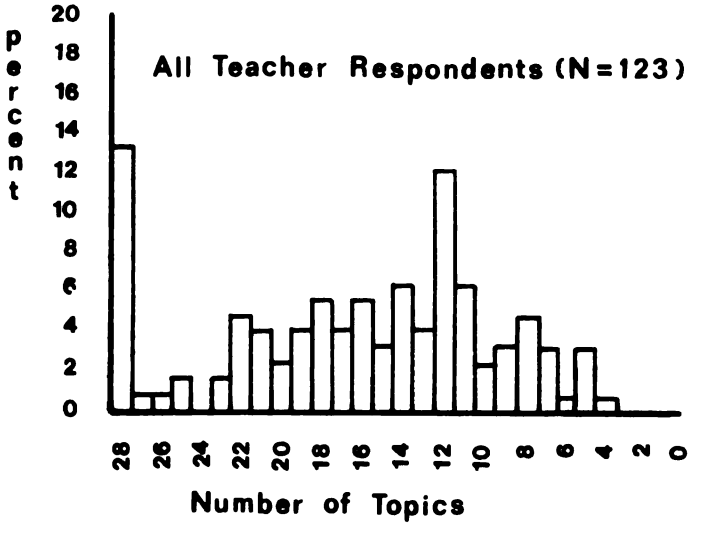


Figure 9. Perceived Content Inclusion Density

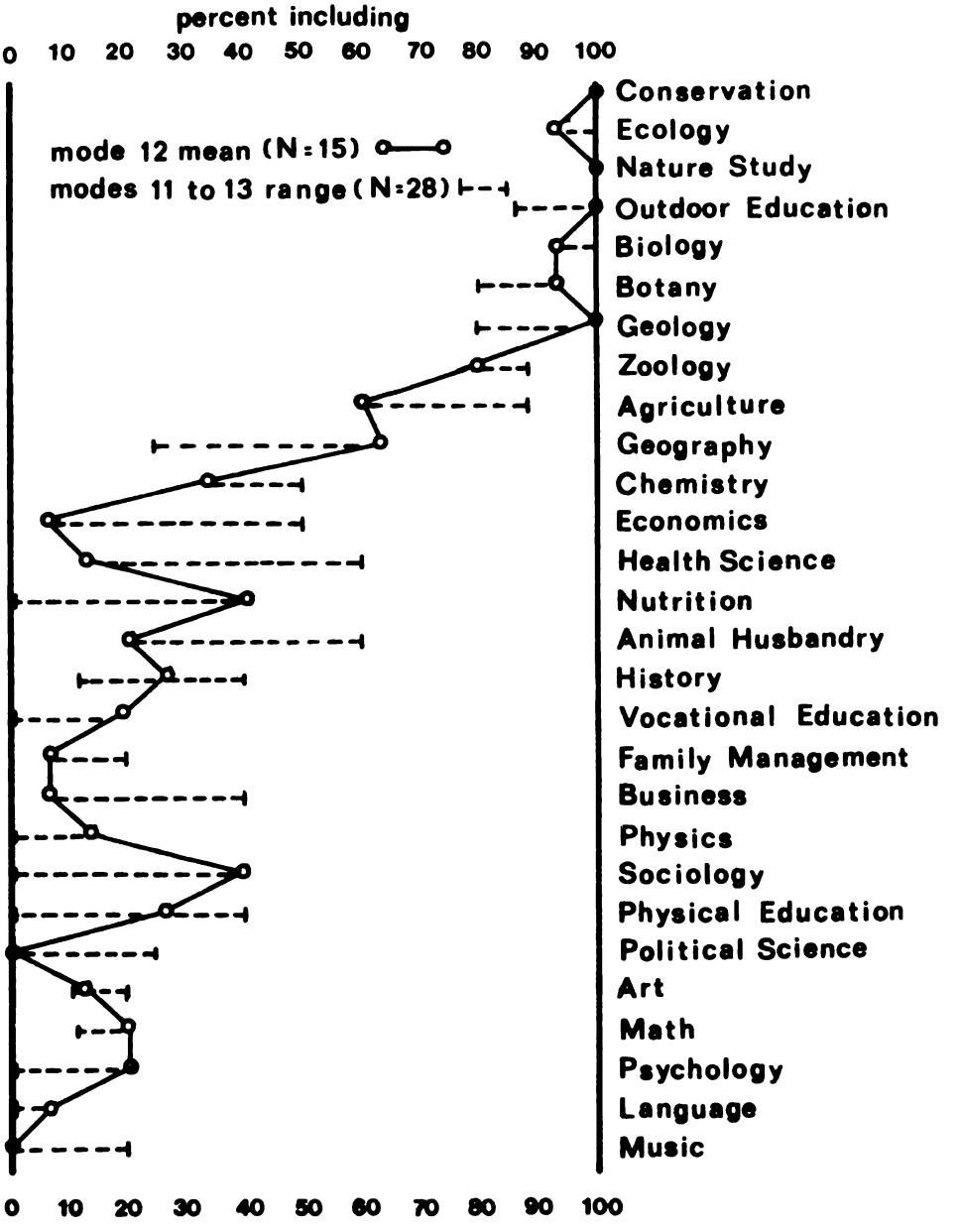


Figure 10. Perceived Content Topic Popularity

It is apparent that the scope of environmental education is not consistently viewed as all-encompassing or as nearly all-encompassing. There is reason to believe that those with a less than holistic view are not consistent in their perception of the curricular scope.

Operational proposition identified as Assumption 2 states that: The teacher-perceived scope of environmental education can be measured using a list of common academic topics. Figures 8 and 9 show that a list of academic topics will demonstrate the scope perceived by a group of teachers, that the range of topics an individual teacher includes may vary from few to all, and that the group distribution may be bimodal with one mode including all of the topics on the list. Figure 10 illustrates that there is little consistency of topic choices in the mid-range mode. This list of topics is a useful indicator of the perceived scope of environmental education of a group of teachers.

Exploration of the potential for correlation between the strength of the Attitude Measure score and the perceived content score showed a negligible relationship according to the Pearson's product-moment correlation procedure. An r^2 value of 0.031, with a significance of 0.053, indicates that high content scores should not be assumed to suggest high attitude scores--nor the reverse.

Environmental Attitude Profile-- Consolidated Index

It was considered both desirable and useful to consolidate the information gathered about TES Teacher attitudes toward environmental affairs into a single, arbitrary index for comparison with subsequent data and possible future group or individual measurements. Of the four attitude aspects measured, two were selected as having continuing utility: Attitude Measure and Perceived Content.

The Attitude Measure alone might well serve most purposes. Since teachers with an expressed (by TES attendance) interest in environmental education were the subjects, it was deemed important to include their views on the scope of environmental education in any meaningful index. The MPOS issues were excluded because they were subject to strong influence of current events. The overall "crisis" view was a general measure, difficult to support with other data and also highly subject to the vagaries of both current events and the environment of the response arena. Thus only the Attitude Measure and Content Perception were included.

The Consolidated Attitude Index was automatically weighted as a consequence of the items and its maximum value was then adjusted to 100 for greater convenience. The following formula for determination of the Index value was used.

$$\text{Attitude Index} = (\text{Attitude Measure} + \text{Content Perception}) \frac{100}{156}$$

The maximum possible score on the Attitude Measure was 128 and on Content Perception the maximum was 28. This ratio of about 5 to 1 was considered not excessively disproportionate for two reasons. First, attitude was the value of primary interest. Second, content perception is to a great extent a function of cognition. The Teachers attend the TES, it is assumed, to expand their knowledge and, since the Index is intended to measure attitude more than knowledge, weighting is considered desirable to reduce the impact of ignorance. Acceptance of the 5 to 1 ratio is arbitrary and others may prefer a different ratio.

Consolidated Attitude Index A, again with a maximum value of 100, is included for its twofold function. First, it represents a reduction of the total Attitude Measure used in this study to partscore A to reflect the alternative acknowledged earlier in the discussion of the Attitude Measure (page 69). Secondly, this reduces the ratio between Attitude Measure and Content Perception to the order of 2.3 to 1 without further manipulation. The acceptance of this latter ratio is again arbitrary but would appear to have advantages when evaluating environmental education teachers.

Inclusion of both of these Indexes was deemed sufficient without attempts to further justify either as acceptance of either remains an arbitrary decision.

Environmental Attitude Profile-- "Urban" vs "Rural"

Several further treatments of data were conducted in an attempt to distinguish between those Teachers living in high population density areas and those living in low population density areas. Again, the artificial distinctions of urban and rural being equated with city-suburb and small town-country should be noted. Of course, more clearly defined distinctions might have been made, but general perceptions were sought in this study and the artificial categories were considered adequate.

To verify or refute the researcher's initial assumption as to the label equivalency, six Teachers were chosen randomly at each of the four sessions, after the questionnaire was administered, and asked variations of the following question: If you were going to divide place of residence into urban and rural instead of city, suburb, small town and country, how would you group them? At the time, the question was considered more academic curiosity than applicable, and trivial to this study. Its relevance only became evident during the processing of data and analysis of survey significance. Asking the question in an organized manner was a serendipitous product of academic training and demand for thoroughness in the process of investigation. The answers were, without exception, to place city and suburb into the urban category and the small town and country into the rural category.

The results of data analysis for each attitude area are presented in Table 11. In no instance were differences between the two groups of any statistical significance. In the area of attitudes, at least, there would appear to be no distinctions which may be readily drawn to distinguish the two groups.

A similar set of comparisons was also made between the Teachers group and the DNR employees. In each area, the Teachers scored consistently higher by from 5 to 17 percent with the differences being statistically either significant or very significant. An important qualification should be made in interpreting these differences. Earlier in this report the point was made that greater knowledge appeared to correlate with less strongly held attitudes (Kupchella and Levy, 1975). It may well be that the lower DNR scores reflect less strongly held views as a consequence of these individuals being better informed. The results of these analyses are presented in Table 12.

TABLE 11.

ENVIRONMENTAL ATTITUDE PROFILE--
"URBAN" vs "RURAL"
ATTITUDE ITEMS

	Density (cases)	Mean	SD	95% C.I.		F	p	df	t	p	Sig.
				+ or -	%						
ATTITUDE MEASURE	Hi (62) Lo (58)	102.29 102.57	17.12 8.99	4.35 2.36	4.3 2.3	3.63	.000	93.5	-.11	.911	N.S.
OPINIONS ON MPOS ISSUES	Hi (62) Lo (58)	29.44 29.69	4.34 3.87	1.10 1.02	3.7 3.4	1.26	.381	118	-.34	.736	N.S.
"CRISIS" VIEW	Hi (62) Lo (58)	2.77 2.72	0.42 0.52	0.11 0.14	3.9 5.0	1.54	.099	118	.58	.564	N.S.
CONTENT PERCEPTION	Hi (62) Lo (58)	16.55 15.78	7.27 6.28	1.84 1.65	11.1 10.5	1.34	.266	118	.62	.536	N.S.
CONSOLIDATED ATTITUDE INDEX	Hi (62) Lo (58)	76.18 75.86	12.50 7.85	3.17 2.07	4.2 2.7	2.54	.001	103.6	.17	.868	N.S.

N.S. = Not Significant

TABLE 12.

ENVIRONMENTAL ATTITUDE PROFILE--
TES Teachers vs TES DNR Employees

	Density (cases)	Mean	SD	95% C.I.		F	p	df	t	p	Sig.
				+ or -	%						
ATTITUDE MEASURE	Teachers (123)	102.30	13.82	2.47	2.4	2.73	.004	65.4	2.62	.011	V.S.
	DNR (28)	97.04	8.36	3.22	3.3						
OPINIONS ON MPOS ISSUES	Teachers (123)	29.56	4.07	0.73	2.5	1.29	.353	149	3.01	.003	V.S.
	DNR (28)	26.93	4.63	1.75	6.5						
"CRISIS" VIEW	Teachers (122)	2.75	0.47	0.08	3.1	1.49	.150	148	3.17	.002	V.S.
	DNR (28)	2.43	0.57	0.22	8.9						
CONTENT PERCEPTION	Teachers (123)	16.17	6.72	1.20	7.4	1.01	.928	149	1.92	.057	S.
	DNR (28)	13.46	6.75	2.62	19.4						
CONSOLIDATED ATTITUDE INDEX	Teachers (123)	75.94	10.51	1.87	2.5	1.61	.154	149	2.41	.017	V.S.
	DNR (28)	70.29	8.30	3.22	4.6						

CHAPTER VII

PERSONAL ENVIRONMENTAL ACTION PROFILE

The teachers attending the 1978 Teachers' Environmental School, according to measures in this study, have a rather strong set of attitudes favoring environmental conservation. They also view environmental issues as moderate or serious problems deserving of attention. The question then to be asked was: Are the personal actions of these TES Teachers in consonance with their attitudes?

Several levels of activity were explored ranging from public demonstrations of concern to private, anonymous actions. The profile of personal environmental actions shown in Figure 11 was derived from the data in Table 13. Figure 11 has been incorporated into Figure 1.

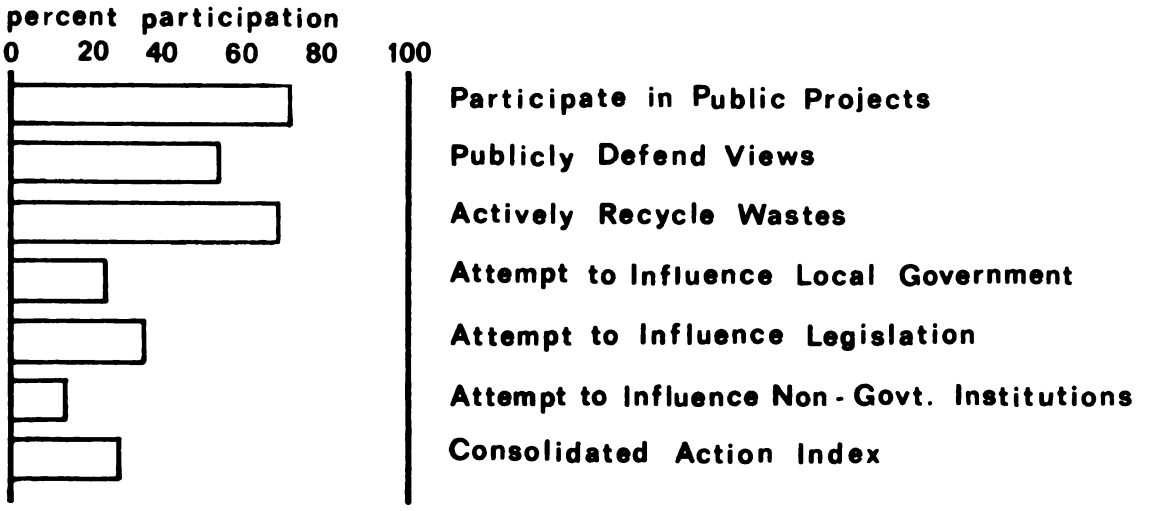


Figure 11. Personal Environmental Action Profile

TABLE 13.

PERSONAL ENVIRONMENTAL ACTION PROFILE--
1978 TES TEACHERS

	N	Mean	SD	95% C.I.		percent participate
				+ or -	%	
PARTICIPATE IN PUBLIC PROJECTS		(Range 0-7)				69.9
*Primary scaling	123	2.39	2.44	0.44	18.2	
*Self-scaling	123	1.88	1.86	0.33	17.7	
PUBLICLY DEFEND ENVIRONMENTAL VIEWS	122	(Range 0-1) 0.525	0.501	0.09	17.0	52.5
ACTIVELY RECYCLE WASTES		(Range 0-7)				63.4
*Primary scaling	123	2.20	2.45	0.44	19.9	
*Self-scaling	123	1.36	1.36	0.24	17.8	
ATTEMPT TO INFLUENCE LOCAL GOVERNMENT	123	(Range 0-1) 0.236	0.426	0.08	32.2	23.6
ATTEMPT TO INFLUENCE LEGISLATION	123	(Range 0-1) 0.333	0.473	0.08	25.2	33.3
ATTEMPT TO INFLUENCE NON-GOVERNMENT	123	(Range 0-1) 0.138	0.347	0.06	44.9	13.8
CONSOLIDATED ACTION INDEX		(Range 0-100)				N.A.
*Primary scaling	122	27.45	24.41	4.37	15.9	
*Self-scaling	122	25.25	23.02	4.13	16.3	

*See text

Personal Action Profile--Project Participation

A question posed to the TES Teachers about their participation in community-type projects, number 71 on the questionnaire, appeared quite modest but offers an interesting picture upon elaboration. As the respondents could check more than one of the three activities presented, the several combinations of possible answers were tabulated. The eight possible answers and their frequency of selection are displayed in Table 14A.

TABLE 14A.

PARTICIPATION IN PUBLIC PROJECTS--PRIMARY ORDER

Project	% Participating (N=123)	Scale Value
None	30.1	0
Cleanup campaign	22.8	1
Beautification project	8.1	2
Environmental protection project	4.1	3
Cleanup AND beautification	14.6	4
Cleanup AND protection	5.7	5
Beautification AND protection	1.6	6
Cleanup, beautification AND environmental protection	13.0	7

Other categories could have been used, of course, but the three categories of cleanup campaigns, beautification projects and environmental protection projects were perceived

by the researcher as being typically common classifications and sufficiently all-inclusive to offer meaningful responses. No attempt was made to clarify the meaning of environmental protection project; the primary reason for its inclusion was to encompass any activities requiring more intensive "feelings" about the environment than would be required by community cleanup and beautification activities.

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, be dependent on the opportunities available. Lack of participation may well be a function of the community rather than the individual.

The public projects item depicted in Figure 11, the overall profile of actions, represents the percentage of all Teachers who indicated any participation in public projects, regardless of type. To evaluate the tendency to participate, a scaling of responses was arbitrarily devised. Any such evaluation is, of course, a combined measure of the individual and the community of residence or employment.

It was assumed that cleanup campaigns and participation in them would be most common and participation the easiest, beautification projects less common and requiring more effort, and environmental protection projects uncommon and more demanding. Combinations of these filled out the scale of values from zero to seven. A mean value was computed as a simplistic evaluative tool.

Examination of data tabulations indicated that a different rank order might be more appropriate. While not refuting the original evaluation order, modifications were introduced to reflect the activity ranking revealed by the data. A new set of scale values was then assigned based on the revised order. This resulted in a self-ordering and self-scaling, established by the respondents, and is presented in Table 14B. The mean value for this self-scaling was computed. Both means are included in Table 13.

TABLE 14B.

PARTICIPATION IN PUBLIC PROJECTS--SELF-SCALED

Project	% Participating (N=123)	Scale Value
None	30.1	0
Cleanup campaign	22.8	1
Cleanup AND beautification	14.6	2
Cleanup, beautification AND environmental protection	13.0	3
Beautification project	8.1	4
Cleanup AND protection	5.7	5
Environmental protection project	4.1	6
Beautification AND protection	1.6	7

The existence of a self-ordering of activities indicates that future research exploring the reasons behind participation in these kinds of projects, including non-participant judgment of the worth of the activity, would

offer valuable insights into the attitudes and social behaviors of similar populations.

With 30 percent of the TES Teachers indicating no participation in these kinds of public projects, one is led to conclude that interest in environmental education shown by attendance at the TES does not necessarily indicate the probability of an active role in community-type environmental projects, either esthetic or protective.

Although the qualification of project availability must be maintained, modification of this qualification is appropriate. Strongly interested persons initiate community projects. The lack of community environmental involvement, such as the foregoing examples, would indicate a lack of the necessary leadership, a role which these TES Teachers might be expected to play. The information collected in this study indicates that this group of TES Teachers does not make a notable contribution to such a community leadership role.

Personal Action Profile--
Publicly Defend Views

There may be limited opportunities to publicly demonstrate active interest in environmental affairs through community participation in environmental "service" projects. There may be more opportunities to simply talk about one's environmental attitude. Do these Teachers take a public stance in defense of their environmental views? Apparently not, since about as many answered "no" as answered "yes" when asked.

Perhaps TES Teachers are aware of their limited knowledge and refrain from public airing of their views because they believe they do not have the information necessary to substantiate their position. Or perhaps these Teachers prefer a "low profile." Or perhaps their views are sufficiently different from those of the rest of the community that they prefer to avoid conflict with their neighbors. More detailed study of these points would be useful in exploring the role environmental education teachers play in influencing adults within the community. The relationship between voicing of environmental views publicly and the conduct of environmental education for school youngsters would also be of value in future studies.

It is noteworthy that public defense of their environmental views is less common than both participation in public projects and the more personal action of recycling wastes, a comparison displayed in Figure 11.

Personal Action Profile-- Actively Recycle Wastes

Participation in public projects is dependent on the project availability and a generalized community tendency toward such activities. It is reasonable to assume that there is less of this dependency when it comes to waste recycling activity. Few school districts would oppose the organization and conduct of recycling centers within the districts whether or not there were already recycling activities functioning in the associated city, town, township or county--if someone is willing to initiate and conduct the program. Thus a basic assumption is that recycling of paper, bottles and cans is a function of choice for these Teachers. If the opportunities are lacking, teachers are in an excellent position to create them and promote their use. Failure to recycle is failure to behaviorally express positive attitudes toward recycling.

Table 15A displays the responses of these TES Teachers to question 70: Do you regularly recycle any of the following materials? -- paper, bottles, cans or metal goods.

As with the participation in public projects item, an arbitrary scaling of responses was devised. The scaling was based on the assumption that paper would be the easiest to recycle and cans the most difficult. The combinations then completed the scale from zero to seven. The mean value serves as a simplistic indicator of willingness to put effort into recycling wastes.

TABLE 15A.

ACTIVELY RECYCLE WASTES--PRIMARY ORDER

Waste Category	% Participating (N=123)	Scale Value
None	36.6	0
Paper	21.1	1
Bottles	5.7	2
Cans	. . .	3
Paper AND bottles	22.0	4
Paper AND cans	0.8	5
Bottles AND cans	0.8	6
Paper, bottles AND cans	13.0	7

TABLE 15B.

ACTIVELY RECYCLE WASTES--SELF-SCALED

Waste Category	% Participating (N=123)	Scale Value
None	36.6	0
Paper	21.1	1
Paper AND bottles	22.0	2
Paper, bottles AND cans	13.0	3
Bottles	5.7	4
Paper AND cans	0.8	5
Bottles AND cans	0.8	6
Cans	. . .	7

Again the responses indicated that a re-ordering and re-scaling might be of value, as in the case of the public projects. Here a decision was made to reverse the positions of two categories in the re-ordering. It appeared that the key item in recycling participation was paper and that a parallel could be drawn with the public projects key-item of cleanup campaign. In addition, the order of these two items was dictated by a single respondent. An intuitive and arbitrary decision, its justification awaits subsequent study. The modified self-ordering and self-scaling is presented in Table 15B. Both means are included in Table 11.

Even fewer of these Teachers recycle wastes than participate in public projects, yet they are less dependent on externally offered opportunity. Perhaps the social approval resulting from public participation encourages activity. Again, one is led to the conclusion that interest in environmental education, as indicated by attendance at the TES, does not necessarily indicate a tendency to personally support practices which environmental education programs espouse.

Personal Action Profile--
Activity Contingencies

It was deemed appropriate to explore some of the factors which might have interactive relationships. The first such contingency table analysis arrayed public project participation and waste recycling activity, shown in Table 16.

The chi-square value significance suggests that any ordered relationship between the two activities, public and personal, is difficult to detect. Inspection of the cell values in Table 16 indicates that nearly one out of seven of the respondents takes no part in either personal environmental improvement activities or in socially approved public environmental projects. It would also appear that the tendency of those who do take action is to choose the easiest.

The possibility that there might be a positive correlation of statistical significance between participation in public projects and membership in civic organizations was also investigated. A statistical relationship appears to exist. However, the value of Cramer's V indicates the relationship is modest at best and the correlation ratio, eta squared, demonstrates that it would be unwise to place any emphasis on its statistical value. The data is arrayed in Table 17.

With more than half of the TES Teachers belonging to no civic groups, it would seem that this group is not particularly inclined to take an active part in organized community activities.

TABLE 16.

PERSONAL ENVIRONMENTAL ACTION--
CONTINGENCY TABLE ANALYSIS,
PUBLIC PROJECTS BY RECYCLING

(Cell value is percent of total, N=123)	No Recycling	Paper	Paper and Bottles	Paper, Bottles and Cans	Bottles	Paper and Cans	Bottles and Cans	Cans
No Projects	13.8	4.1	6.5	2.4	2.4	0.8		
Cleanup Campaign	7.3	6.5	1.6	5.7	0.8		0.8	
Cleanup and Beautify	5.7	2.4	4.9	1.6				
Cleanup, Beautify, Protect	3.3	3.3	3.3	1.6	1.6			
Beautify	1.6	2.4	4.1					
Cleanup and Protect	3.3	0.8	0.8	0.8				
Protect	0.8	1.6	0.8	0.8				
Beautify and Protect	0.8				0.8			

Chi square = 38.04; df = 42; significance = 0.65
Cramer's V = 0.227
Eta squared = 0.025

TABLE 17.

PERSONAL ENVIRONMENTAL ACTION--
CONTINGENCY TABLE ANALYSIS,
PROJECTS BY CIVIC GROUPS

(N=123)	Memberships Count Percent					Total Action %
	None	1	2	3	More than 3	
No Public Projects	25 20.3	7 5.7	3 2.4		2 1.6	30.1
Cleanup Campaign	16 13.0	3 2.4	8 6.5		1 0.8	22.8
Cleanup and Beautify	9 7.3	4 3.3	4 3.3	1 0.8		14.6
Cleanup, Beautify and Protect	7 5.7	4 3.3	1 0.8	2 1.6	2 1.6	13.0
Beautify	3 2.4	3 2.4	3 2.4		1 0.8	8.1
Cleanup and Protect	3 2.4	4 3.3				5.7
Protect	2 1.6	1 0.8			2 1.6	4.1
Beautify and Protect	2 1.6					1.6
Memberships Total %	54.5	21.1	15.4	2.4	6.5	

Chi square = 41.35; df = 28; significance = 0.05
Cramer's V = 0.290; eta squared = 0.084

Considering that length of residence in a community might play an important part in influencing these Teachers to participate in public projects, the contingencies were developed as displayed in Table 18. Again, statistical correlations are negligible.

There is an indication, however, through inspection of the table, that length of residence does have some effect. After a sufficient time, there may be some tendency to demonstrate an active interest in the community, providing the project requires only modest effort.

TABLE 18.

PERSONAL ENVIRONMENTAL ACTION--
CONTINGENCY TABLE ANALYSIS,
PROJECTS BY RESIDENCE TIME

(N=122)	Time Count Percent			Total Action %
	0-5 years	5-10 years	More than 10 years	
No Public Projects	12 9.8	10 8.2	15 12.3	30.3
Cleanup Campaign	3 2.5	11 9.0	14 11.4	23.0
Cleanup and Beautify	4 3.3	3 2.5	10 8.2	13.9
Cleanup, Beautify and Protect	3 2.5	4 3.3	9 7.4	13.1
Beautify	2 1.6		8 6.6	8.2
Cleanup and Protect	2 1.6		5 4.1	5.7
Protect	2 1.6	2 1.6	1 0.8	4.1
Beautify and Protect	1 0.8		1 0.8	1.6
Time Total %	23.8	24.6	51.6	

Chi square = 16.84; df = 14; significance = 0.265
Cramer's V = 0.263; eta squared = 0.055

Personal Action Profile--Attempts to Influence

Item 72 of the questionnaire distinguished between three different types of organizations which might be influence targets of environmentally interested people: local government policy-making and law-making bodies, the state government law-making body and non-governmental institutions either commercial or not. The manner of communication was specified as some later weighting of responses was anticipated. The response pattern is recorded in Table 19.

TABLE 19.

ATTEMPTS TO INFLUENCE

Target Group	% Attempting to Influence (N=123)
Local government	23.6
Legislature	33.3
Non-government	13.8

Further, the respondents were asked to indicate their feelings as to the effectiveness of their attempts to influence--whether the respondents thought such actions were generally worthwhile. Only a generalized evaluation was desired. The results are arrayed in Table 20.

TABLE 20.

ATTEMPTS TO INFLUENCE--PERCEIVED EFFECTIVE

Target Group	Affected Outcome Perception %		
	No	Maybe	Yes
Local government (N=30)	20	30	50
Legislature (N=42)	19	55	26
Non-government institution (N=17)	29	47	24

The attempt to influence local government specified attendance at a meeting. Requiring a personal appearance regarding an issue, while it may have been loosely interpreted by some respondents, places the individual in a visible position where views become known by several persons other than family and friends. This attempt to influence was considered to have a greater "degree of difficulty" than the other two. Of course, as this may often be a group appearance, some measure of anonymity may often be retained.

A letter to a legislator doubtless permits the perceived retention of anonymity in most cases. It may, however, require considerable commitment to a point of view to compose a letter attempting to influence a legislator rather than join with social or professional peers in a public appearance, especially if someone else is the spokesperson for the group.

Perhaps the perceived potential for effectiveness discourages communication with non-governmental organizations or institutions. Again, anonymity perception may be high. The need for support of an opposition view based on knowledge or other avenues of influence may be perceived as high when communicating with public utilities or business enterprises thus imposing internal limits on the potential for this action.

There is considerable difference in the attempts-to-influence participation of these TES Teachers. Opportunity may play a role but non-participation is dominant, offering support to a growing view that these Teachers, although expressing interest in environmental matters, do not take an especially active part in affecting the course of environmentally significant events.

Do those attempting to influence consider their efforts worthwhile? Table 20 indicates that appearances before a local policy- or law-making body are considered effective. There is less confidence in the effect of a letter on legislation although it is the more popular course of action. The evaluation of effectiveness when attention is directed toward non-governmental bodies decreases, yet the majority of those who made the effort did not consider it necessarily wasted. Considerably larger samples would be necessary to infer more.

Personal Action Profile-- Consolidated Index

It was judged to be both useful and desirable to consolidate the several categories of information regarding TES Teacher personal actions concerning environmental matters into a single index. This would allow convenient comparison with other data and future group or individual measurements. Of the six action categories, all but one were considered meaningful and of continuing utility.

The following formula for determination of the Index value was used.

$$\text{Consolidated Action Index} = ((\text{Defend} \times 7) + (\text{Recycling} \times 2) + (\text{Local government} \times 28) + (\text{Legislation} \times 14) + (\text{Non-government} \times 14)) \frac{100}{77}$$

The maximum value sequence within the formula is 7, 14, 28, 14 and 14. The maximum value of the Consolidated Personal Action Index is 100.

The participation in public projects category was judged subject to excessive opportunity influence for consistent use. Although these Teachers might have an important bearing on the occurrence of such projects, there are many variables over which they would have little or no control and which would change depending on the community. It was, therefore, excluded for the index.

It may be argued that public defense of environmental

views is also a matter of opportunity. This category was retained, although given only half-weight. This reduction was applied first, because interpretation of the item by the respondents could have allowed an affirmative response when the defense was made anywhere, including the classroom, or before a sympathetic audience. Secondly, vocalized views were judged by the researcher to have less significance than actions which required deliberate thought and an input of time and energy. It also appeared that a reduction in value because of reduced opportunity-to-defend would be offset by opportunities-to-proselytize. This inclusion with value reduction appears appropriate to the purpose of the index and within a reasonable range.

Whereas public projects are often a matter of opportunity, waste recycling is much more under the control of the individual teacher. Here their own enterprise is the principal factor since there are institutional means available in a school system to support and expedite recycling programs which may otherwise be unavailable. The more comprehensive the recycling activities, the more value is assigned through the scaling mechanism of this item.

Attempts to influence were judged to be positive actions extending beyond customary personal activities and interpersonal exchanges. All three require some knowledge and ability to communicate knowledge. Teachers were assumed to have both.

Of course, specific knowledge of an environmental

matter may be missing from an individual teacher's repertoire of cognitive skills. However, by education and experience they were judged capable of acquiring the necessary information on a particular topic which would enable them to voice their views cogently and coherently. The Teachers' Environmental School experience would provide an enlarged conceptual framework as well as some specific skills for application in the school setting. Although one may point to attendance at the TES as recognition of lack of knowledge upon which to base an attempt to influence social, political and economic institutions, it should be pointed out that many of the environmental matters may be approached from the standpoints of social effects, economic effects and political effects, not just biophysical effects. These Teachers should be able to find sufficient knowledge in at least one of these areas upon which to base an influencing argument. The ability to communicate knowledge is assumed an essential characteristic of a Teacher.

The attempt to influence local governing bodies was given double weight in the index. This decision was based on the assumption that it requires more knowledge, more commitment and more time than the other attempts to influence. The high visibility of this action was deemed worthy of considerably more weight than the personal action of recycling as the latter would take place either privately or within the more comfortable structure of the professional sphere. The other two attempts to influence were considered

less demanding than the local government attempt and were thus given "base" weighting.

The Index values in Table 13 display both the primary scaling and the self-scaling effect when the Index value is computed using the two values of the waste recycling item.

It is the judgment of the researcher that the use of self-scaling values has less utility than an arbitrary scale in the evaluation of this and other groups which may be studied in the future. Re-ordering based on group valuation at the time of measurement creates analysis complications which seem to offer little benefit. It will be of value to reassess the scaling system for this item when the effects of bottle and can return laws become established. The bottle and can return laws may well place these item classifications in positions of approximately equal scale value and could, in fact, make separation of items of little or no significance in a valuation index. Subsequent research will be of assistance in clarifying this point.

The Consolidated Action Index is considered sufficiently reliable and useful for comparative purposes within the scope of this survey. It includes both verbal and physical (through verbal response) expressions of a position on environmental matters and emphasizes overt behaviors. The items and weighting within the Index formula will affect its general utility for other researchers.

Personal Environmental Action--Correlation with Attitude

In an effort to determine if there was a correlation of statistical significance between the attitudes and the personal actions of these TES Teachers, a bivariate correlation procedure was performed. Pearson's r correlations indicate, as shown in Table 21, that there is little or no correlation between the indexes used for the comparison.

TABLE 21.

ATTITUDE AND ACTION--BIVARIATE CORRELATION

Pearson product-moment correlation (N=123)		
Attitude Index with Action Index (with primary scaling)	Pearson's r	0.276
	r^2	0.076
	significance of r	0.001
	Standard Error of estimate	10.096
Attitude Index with Action Index (with self-scaling)	Pearson's r	0.261
	r^2	0.068
	significance of r	0.002
	Standard Error of estimate	22.386

Hypothesis 1 states: There is no significant relationship between environmental actions and environmental attitudes of the selected teacher population. The bivariate correlation confirms this hypothesis. These teachers achieved high scores on the Attitude Measure. However, they do not support these attitudes with personal actions favorable to environmental conservation.

Personal Action Profile-- "Urban" vs "Rural"

As with the Environmental Attitude Profile, several statistical procedures were performed in an effort to distinguish between TES Teachers living in high population density areas and those living in low population density areas. The artificial distinctions were again drawn equating urban with city-suburb and rural with small town-country. Although clearer definitions might have been drawn, the general perceptions were deemed adequate for this study and matched the delineations used in analysis of attitudes.

The data analysis for each personal action area is displayed in Table 22. In no instance was any difference of statistical significance identified.

The higher raw scores for urbanites in the public projects and recycling segments may well be evidence of increased opportunity for participation in areas of high population density.

It would appear that these "rural" dwellers are more inclined to attend meetings of local government and make their views known, at least by their presence. Perhaps it would be more usefully descriptive to say that the "urban" dwellers are less inclined to take this step since neither portion of the population exhibits especially strong tendencies to such activity.

High-density dwellers among these TES Teachers may be more inclined to write letters of complaint to their state

TABLE 22.

PERSONAL ACTION PROFILE--
"URBAN" vs "RURAL"

	Density (cases)	Mean	SD	95% C.I.		F	p	df	t	p	Sig.
				+ or -	%						
Participate in Public Projects*	Hi (62)	2.548	2.441	0.62	24.3	1.01	.96	118	1.00	.32	N.S.
	Lo (58)	2.103	2.426	0.64	30.3						
Publicly Defend Environ. Views	Hi (62)	0.500	0.504	0.13	25.6	1.00	.99	118	- .37	.70	N.S.
	Lo (58)	0.534	0.503	0.13	24.7						
Actively Recycle Wastes*	Hi (62)	2.435	2.640	0.67	27.5	1.37	.23	118	.97	.34	N.S.
	Lo (58)	2.000	2.256	0.59	29.6						
Attempt Influence Local Government	Hi (62)	0.177	0.385	0.10	54.8	1.37	.22	118	-1.29	.20	N.S.
	Lo (58)	0.276	0.451	0.12	43.1						
Attempt Influence Legislation	Hi (62)	0.387	0.491	0.12	32.3	1.24	.42	118	1.50	.13	N.S.
	Lo (58)	0.259	0.442	0.12	45.2						
Attempt Influence Non-government	Hi (62)	0.161	0.371	0.09	58.4	1.46	.15	118	.93	.35	N.S.
	Lo (58)	0.103	0.307	0.08	77.7						
Consolidated Action Index*	Hi (62)	26.903	22.808	5.79	21.5	1.17	.54	118	.14	.89	N.S.
	Lo (58)	26.310	24.714	6.50	24.7						

*Primary scaling

N.S. = Not Significant

legislators and to non-government institutions than their low-density counterparts, to judge from the mean data. It would be unwise to attempt additional interpretation considering the extreme spread of responses indicated by the standard deviations accompanying these means.

The data make a strong case for avoiding any inferences about larger populations. The wide spread of the 95 percent confidence interval indicates little likelihood that these surveyed populations would come close to representing a simple random sample of populations larger than themselves. The null hypothesis of equality between these two populations is not decidedly accepted since there is a strong possibility of a Type II error by acceptance. The comparison is considered inconclusive.

A similar set of comparisons was drawn for the TES Teachers group and the DNR employees group. There is a decided difference between these two groups in all but the two "letter-writing" categories, as shown in Table 23.

Unlike the attitudes comparisons noted on page 94, the DNR employees scored significantly or very significantly higher, consistently, than did the Teachers. Even in the two categories where differences were not significantly different, the raw scores were higher. Again, the variability is very high and there is no support for assumption that these populations are an acceptable simple random sample.

It appears that, unlike the TES Teachers, the DNR employees are personally involved in environmentally sound

TABLE 23.

PERSONAL ACTION PROFILE--
TEACHERS vs DNR

	Group	Mean	SD	95% C.I.		F	p	df	t	p	Sig.
				+ or -	%						
Participate in Public Projects	Teach.	1.878	1.862	0.33	17.7	1.43	.19	149	-1.98	.05	S.
	DNR	2.679	2.229	0.86	32.3						
Publicly Defend Environ. Views	Teach.	0.525	0.501	0.12	23.9	1.19	.62	148	-1.83	.07	N.S.
	DNR	0.714	0.460	0.12	16.1						
Actively Recycle Wastes	Teach.	1.358	1.356	0.24	17.8	2.67	.00	31.8	-2.29	.03	S.
	DNR	2.357	2.215	0.86	36.4						
Attempt Influence Local Government	Teach.	0.236	0.426	0.11	45.2	1.43	.20	148	-3.01	.003	V.S.
	DNR	0.518	0.509	0.13	24.5						
Attempt Influence Legislation	Teach.	0.333	0.473	0.12	35.5	1.12	.66	148	- .73	.47	N.S.
	DNR	0.407	0.501	0.12	30.7						
Attempt Influence Non-government	Teach.	0.138	0.347	0.09	62.8	1.80	.04	32.6	-1.67	.11	N.S.
	DNR	0.296	0.465	0.12	39.2						
Consolidated Action Index	Teach.	27.826	24.475	6.12	22.0	1.93	.02	32.2	-2.59	.01	V.S.
	DNR	43.593	32.384	12.81	29.4						

Teachers total N = 123
DNR total N = 28

N.S. = Not Significant
S. = Significant
V.S. = Very Significant

action. Although their attitudes are less strongly held, they are inclined to do something about environmental matters on a personal level. Caution is advised, however, in placing too much strength in comparative interpretations of this data. A number of these items may reflect job-related activity such as attempts to influence local government or non-government enterprises. Also, defense of environmental views does not distinguish the view being defended. Even waste recycling may be a consequence of employment responsibilities. Thus the Consolidated Action Index may well be grossly in error for DNR employees. In this comparison, adherence to the evidence offered by the statistics may be very misleading in the evaluation of strictly personal actions.

CHAPTER VIII

ENVIRONMENTAL EDUCATION PRACTICES PROFILE

The teachers surveyed at the 1978 Teachers' Environmental School have indicated in this study rather strong attitudes favoring environmental conservation. The same individuals, however, appear to have weak tendencies to conduct personal activities in keeping with the attitudes expressed. With reported actions in their personal lives in such dissonance with their expressed attitudes, are their professional activities perhaps more in keeping with their attitudes?

Several points of information were approached in an effort to arrive at an overall measure of the practices of these Teachers in their conduct of environmental education. The profile of environmental education practices is presented in Figure 12 from data shown in Table 24. Figure 12 has been incorporated into Figure 1.

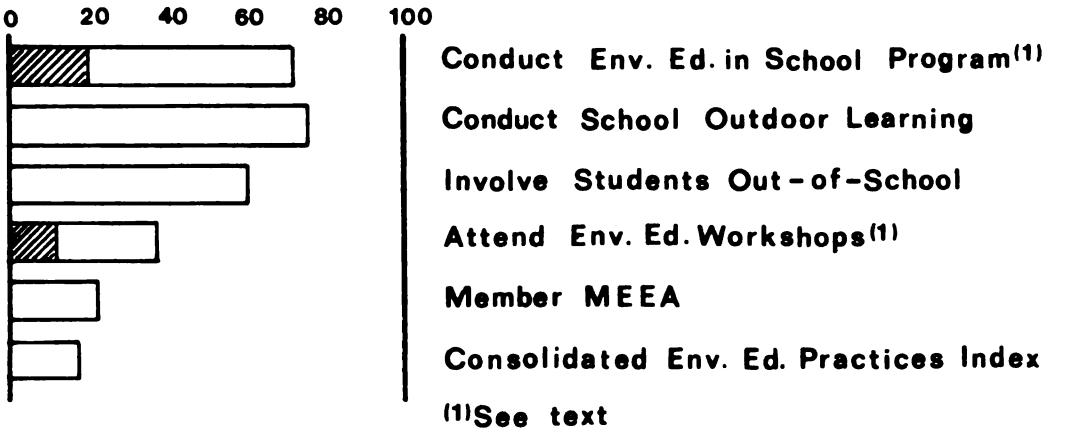


Figure 12. Environmental Education Practices Profile

TABLE 24.

ENVIRONMENTAL EDUCATION PRACTICES PROFILE--
1978 TES TEACHERS

	N	Mean	SD	95% C.I.		percent participate
				+ or -	%	
Minutes Weekly in School Program	96	(Range 0-300) 56.87	70.50	14.28	25.1	71.5*
Conduct School Outdoor Learning	119	(Range 0-1) 0.748	0.436	0.079	10.6	74.8
Involve Students Out-of-school	119	(Range 0-1) 0.597	0.493	0.090	15.1	59.7
Attend Environmental Education Workshops	122	(Range 0-6) 0.582	0.935	0.168	28.9	36.9
Member MEEA	123	(Range 0-1) 0.228	0.421	0.076	33.3	22.8
Consolidated Environmental Education Practices Index	94	(Range 0-100+) 17.447	12.805	2.623	15.0	N.A.

*Total (123) less zero and no response.

N.A. = Not Applicable

Environmental Education Practices Profile-- Minutes per Week

An especially pertinent question in attempting to measure environmental education practices is the amount of time these Teachers spend environmentally educating their students. In formulating the questionnaire, considerable attention was devoted to arriving at one or more questions which might elicit this information with minimal bias, maximal validity and maximal reliability. Observation would, of course, be a highly desirable method, yet this, too, offers a number of variables and intangible effects. After consideration of the literature on the subject, the scope of the survey, the length of the questionnaire, the environment of the questioning, the purpose of attendance at the TES and the purpose of the survey, the decision was made to approach the subject in a straight-forward manner and judge success when the results were in. Thus the self-reporting question 61, and its companion question 62, was posed.

Evaluation of the response patterns indicates considerable candor implying modest bias. Perhaps this was due in part to an inability of the respondents to anticipate what might be considered the "right" answer. Again it should be emphasized that perceptions of content as well as time are essential in responding to the question: About how much time do you spend, on the average, each day or each week on environmental education?" The companion question about average teachers in their school offers an interesting

comparison without special inferences in this report. It would appear that the self-evaluation is supported by the "others" evaluation. The Pearson's product-moment correlation of the perceived-time others spend on environmental education compared with the time the TES Teachers reported for themselves shows a modest linear relationship. The r^2 value of 0.218, with a significance of 0.00001 (N=81), suggests that Teachers who spend time conducting environmental education themselves are inclined to see others as also giving some time to the subject. However, inspection of the scattergram representing the Pearson correlation distribution indicates that low values so dominate the data that no further conclusions should be drawn. Figure 13 displays the range of estimates in answering both questions.

Half of those Teachers responding with more than 150 minutes per week, four teachers out of eight, also included in the grade-taught or subject-taught item some reference to outdoor education, conservation or environmental education.

Perhaps those respondents estimating other-teacher time at two hours per week or more have an increased view of environmental education as holistic, although their range of content topics selected did not exceed the mean for that item. Or, the other-teachers may have been the colleagues influencing TES attendance.

Some of the response pattern modes detailed in the Figure 13 histogram are probably a result of teachers thinking in terms of class period units, or hours and their

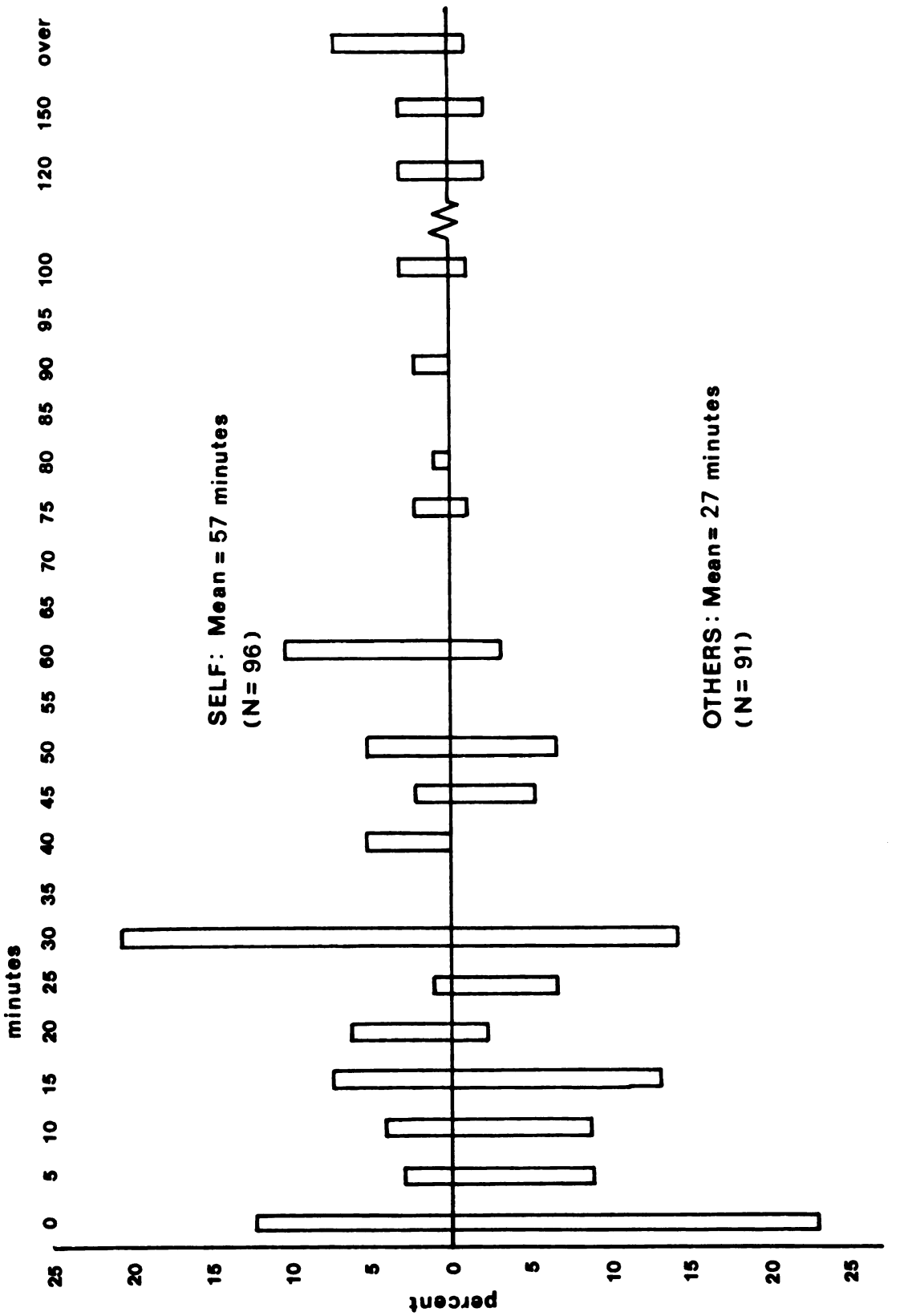


Figure 13. Minutes Per Week Conducting Environmental Education

subdivisions into halves and quarters, and reflecting this in their responses.

The percentage shown in Figure 12 as conducting environmental education in the school program includes all of those reporting any time at all, from five minutes per week to 300 or more. In converting this so as to represent mean time as a percentage of maximum time, it is necessary to establish a maximum. Excluding the one full-time specialist and the three who reported more than 500 minutes, the next lowest potential maximum appears at 300 minutes, with four responses at 300, two at 250, one at 200 and others as shown in Figure 13. Using this arbitrary upper limit of 300 as a maximum, the mean to maximum percentage is 19 and is represented in Figure 12 by the hachured area.

Nearly 21 percent of these TES Teachers reported 30 minutes per week spent in conducting their perception of environmental education. The form of the question and the approximation probably contributed somewhat to the popularity of this mode. It should be kept in mind that this represents about 6 minutes per day out of the reported five to six hours per day of class-teacher contact time. The mean represents about 12 minutes per day for these Teachers, not an especially large increase over the five-plus minutes per day estimated for the average teacher in their school. The 57 minutes per week mean represents less than four percent of the total, average, contact time per week.

With the possibility that there might be a correlation between the amount of time reported spent on environmental education and attitudes or even actions toward environmental affairs, bivariate correlation procedures were performed. The Pearson's product-moment correlations are shown in Table 25.

TABLE 25.

CLASS TIME vs ATTITUDES AND ACTIONS

Pearson product-moment correlation		
Minutes per week with Attitude Index (N=96)	Pearson's r	0.014
	r^2	0.0002
	significance of r	0.445
	Standard Error of estimate	70.867
Minutes per week with Action Index (N=95)	Pearson's r	0.146
	r^2	0.021
	significance of r	0.079
	Standard Error of estimate	70.245

There appears to be no correlation of statistical significance between time spent conducting environmental education in the classroom and either attitudes or actions toward the environment. This was a quite unexpected finding. The research hypothesis assumed that either strong attitudes or strong actions would correspond with a perceived importance attached to classroom environmental education and be expressed in an increase in classroom time. There is apparently no such relationship and thus the null hypothesis, part of Hypothesis 2, would prevail.

Environmental Education Practices Profile-- Outdoor Learning Experiences

Three-fourths of the 1978 TES Teachers surveyed indicated that they conducted outdoor environmental learning experiences for their classes. It would seem that they consider outdoor experiences to have some value in learning about environmental matters.

Reservation is appropriate here as some Teachers may have included a positive answer to this item because of the workshop setting of the questioning. They may also have converted a restricted biology-experience in the outdoor arena to the broader-based environmental education. The converse of the latter may also have been true in that some of the one-quarter remaining may have used the outdoors as an extension of the classroom but considered it too limited an experience to fit their perception of environmental education. Nonetheless, it is reasonable to assume that Figure 14 fairly represents distribution of use of the outdoors, with the survey setting biasing responses somewhat toward a "yes" response.

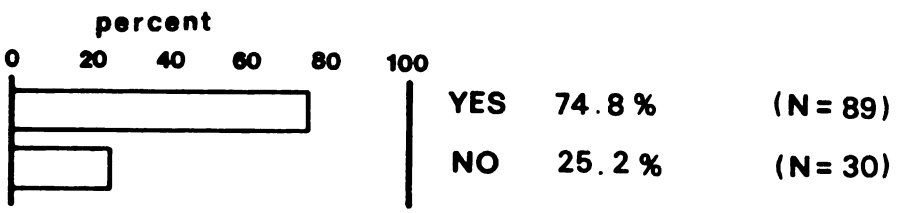


Figure 14. Outdoor Environmental Learning Experiences

In order to more clearly delineate categories of use of the outdoor learning arena, gross subdivisions were generated as to type of site. A research hypothesis assumed rural sites would be more popular than urban sites, in general, but posed a further question as to use of available areas. Figure 15 summarizes site-use practices of these TES Teachers.

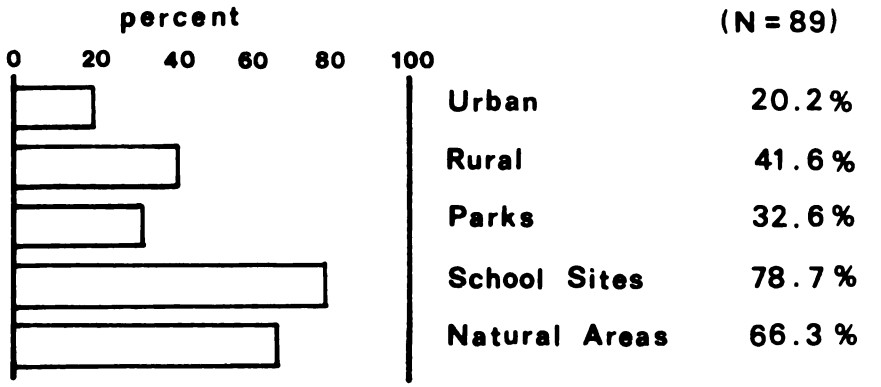


Figure 15. Site Use

Although more detailed information could have been requested, it was decided that only major emphases would be sought within this survey.

It was a concern that the classification of small sites actually used into the urban-rural dichotomy might create serious perception problems for the respondents and thus result in misleading data in a simple urban-rural distinction. The provision of additional alternatives within the question, it is believed, offered opportunity for the respondents to modify their urban-rural responses so as to

clarify the data for subsequent interpretation. The three categories of parks, school sites and natural areas, allowing response to "all that apply," offered very general divisions so that major emphases could be determined. The tendency to use of school sites was of special interest to the researcher.

As expected, more of these TES Teachers indicated use of rural areas than urban areas. With only 62 percent of the respondents checking either, it appears that the concern for dichotomous-distinction problems was warranted.

There may well be serious variations in transportation availability for individual schools and for whole school districts, thus affecting site choice and use patterns. However, urban sites are decidedly less popular, among those who made the distinction, implying that these Teachers consider rural areas more suitable for the conduct of outdoor environmental learning experiences with their classes. Inference may then be tentatively drawn that these Teachers do not see urban areas as having the environmental learning significance of rural areas. This is, of course, in conflict with the concept of holism. It might well be explored in more detail in further studies and should be considered during development of detailed curricula.

Figure 15 illustrates both the urban-rural usage and the other-site use categories offered to the respondents. It is readily apparent that these Teachers are heavy users of school sites, if they conduct outdoor learning at all. There also seems to be a tendency to prefer those areas identified

as natural. School sites may be "natural areas" away from the school building and owned by the schools. Areas perceived as natural may also be tiny plots in a corner of the school yard. Better definition is needed for further inferences. The popularity of school sites is a useful indicator for administrators and educators to consider in both site and curriculum planning.

When the question is asked as to who uses what areas, the data offer a general pattern, shown in Table 26. The data for grades K-3 support the contention that convenience is important for young children with the relative emphasis on urban locations and school sites. Upper elementary grades, on the other hand, make more use of areas away from the school itself, to judge from these quantities of use. It appears that these Teachers find field trips for upper elementary pupils of value whereas Teachers of early elementary pupils prefer the school's grounds.

Data shown in Table 26 are in agreement with opinions expressed by many individual teachers who consider the problems inherent in field trips for early elementary pupils and the merits of field exercises when contrasted with the controlled conditions of the classroom. Many factors would influence outdoor learning opportunities at the junior high school and high school levels, not the least of which would be the time constraints of curriculum structures.

TABLE 26.

GRADE LEVELS AS PERCENT OF SITES USED

(N=89) Grades taught	Urban (20%)	Rural (42%)	Parks (33%)	School Sites (79%)	Natural Areas (66%)
K-3	47.1	35.3	22.2	37.3	30.2
4-6	29.4	44.1	48.1	37.3	45.3
Junior high	. . . .	5.9	7.4	7.5	9.4
High school	23.5	14.7	22.2	17.9	15.1
Total	100.0	100.0	99.9	100.0	100.0

Assumptions of correspondence must remain essentially intuitive at this point. The contingency table analyses of Tables 27 and 28 show low or very low correlation ratios (eta^2) with unimpressive chi square and Cramer's V values, except in the case of school sites. Kendall's tau c does show some tendency for both school sites and natural areas to lose popularity with higher grade levels. The latter point would also hold for urban and rural areas, a reflection of a decrease in outdoor learning experience as a whole rather than location preference.

The techniques for these analyses is tentative and the data should be used only as indicators. Refinement in data collection methods and analysis procedures is recommended if further exploration in this area is desired.

TABLE 27.

OUTDOOR LEARNING SETTING--
CONTINGENCY TABLE ANALYSIS,
GRADE BY URBAN AND RURAL

(N=107) Grade taught	Urban		Rural	
	Not used	Used	Not used	Used
K-3	20 18.7%	8 7.5%	16 15.0%	12 11.2%
4-6	38 35.5%	5 4.7%	28 26.2%	15 14.0%
Middle school or junior high	15 14.0%	. . . . . .	13 12.1%	2 1.9%
High school	17 15.9%	4 3.7%	16 15.0%	5 4.7%

URBAN: Chi square = 6.945; df = 3; significance = 0.074
Cramer's V = 0.255
Kendall's tau c = -0.115; significance = 0.071
eta squared = 0.065

RURAL: Chi square = 4.746; df = 3; significance = 0.1914
Cramer's V = 0.211
Kendall's tau c = -0.188; significance = 0.029
eta squared = 0.044

TABLE 28.

OUTDOOR LEARNING SETTING--CONTINGENCY TABLE ANALYSIS, GRADE BY PARKS, SCHOOL SITES, NATURAL AREAS

	Parks		School sites		Natural areas	
Grade taught	Not used	Used	Not used	Used	Not used	Used
K-3	22 20.6%	6 5.6%	3 2.8%	25 23.4%	12 11.2%	16 15.0%
4-6	30 28.0%	13 12.1%	18 16.8%	25 23.4%	19 17.8%	24 22.4%
Middle school or junior high	13 12.1%	2 1.9%	10 9.3%	5 4.7%	10 9.3%	5 4.7%
High school	15 14.0%	6 5.6%	9 8.4%	12 11.2%	13 12.1%	8 7.5%

PARKS:
Chi square = 2.034; df = 3; significance = 0.565
Cramer's V = 0.138
Kendall's tau c = 0.013; significance = 0.443
eta squared = 0.019

SCHOOL SITES:
Chi square = 14.640; df = 3; significance = 0.002
Cramer's V = 0.370
Kendall's tau c = -0.312; significance = 0.001
eta squared = 0.137

NATURAL AREAS:
Chi square = 4.001; df = 3; significance = 0.261
Cramer's V = 0.193
Kendall's tau c = -0.181; significance = 0.045
eta squared = 0.037

Environmental Education Practices Profile--
Workshop Attendance

The avowed purpose of environmental education workshops is to enable teachers to better prepare themselves to conduct environmental education. It is especially noteworthy that 36.9 percent of the 1978 TES Teachers surveyed attended one or more environmental education workshops or seminars during the year immediately preceding their attendance at the Teachers' Environmental School. This would seem to indicate a rather strong interest in improving their abilities in environmental education.

The distribution of this attendance is shown in Figure 16. The mean attendance noted here is represented by the hachured area in Figure 12 and used a maximum of five workshops attended for its determination.

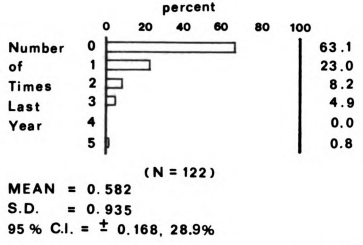


Figure 16. Environmental Education Workshop Attendance

In order to explore the probabilities of correlation between an effort to improve their abilities and their tendency to conduct environmental education in the school program, a contingency table analysis was conducted and is presented in Table 29. Several points of interest become apparent from a study of this table.

The dispersion center method of categorization was used to reduce the range of minutes per week to a manageable system. The groupings still represent considerable diversity.

One-third of these TES Teachers spent ten minutes or less per week on environmental education yet one-quarter of this same group attended workshops or seminars during the year preceding the 1978 TES.

More than one-quarter of these Teachers spent 26-50 minutes per week on environmental education while less than half of this group attended sessions for skill improvement. Simplified interpretation of this data should be approached with care; the 26-50 category may represent a reported 5 to 10 minutes per day or one "class-period" per week, which would imply quite different approaches to the study of environmental matters.

This particular group of TES Teachers, it would appear, attends workshops without a particularly high level of time commitment to environmental education. Of course the workshops and seminars may improve the quality of the instructional time. Advocates of holism in environmental education will probably be disappointed to see such a modest

TABLE 29.

WORKSHOP ATTENDANCE--CONTINGENCY TABLE ANALYSIS,
MINUTES IN SCHOOL PROGRAM BY WORKSHOP ATTENDANCE

Minutes per week	Number of Workshops Attended						row total
	0	1	2	3	4	5	
	percent of total respondents						
0	21.3	3.3	2.5	.8			27.9
1-10	4.1	.8		.8			5.7
11-25	9.0	2.5					11.5
26-50	14.8	9.0	1.6	.8			26.2
51-75	5.7	1.6	.8	.8		.8	9.8
76-100	2.5	1.6	.8				4.9
101-125	2.5						2.5
126-150		.8	.8	.8			2.5
151-250	2.5						2.5
251-HI	.8	3.3	1.6	.8			6.6
total	63.1	23.0	8.2	4.9		.8	N=122

Chi square = 43.21; df = 36; significance = 0.19
Cramer's V = 0.298
Kendall's tau c = 0.186; significance = 0.002
Gamma = 0.327
Pearson's r = 0.248; significance = 0.003; r^2 = 0.061

proportion of the school week perceived as a part of environmental education activity.

Is there any particular correlation between workshop attendance and school-time in environmental education? Apparently not much. None of the statistics stimulate much enthusiasm, the most useful of which are noted in Table 29.

It would appear that holism is not stressed in the workshops attended or else is not acquired by these Teachers. However, as the time of attendance was not determined, many of the workshops available being scheduled late in the school year, it may be that these Teachers would show a higher time commitment or stronger holism perception the next year, or following the TES experience. Study through time would help resolve this point.

Environmental Education Practices Profile--Professional Membership

Figure 12 and Table 24 represent that less than one quarter of these 1978 TES Teachers belong to the professional association created and maintained to assist teachers in the conduct of environmental education. On the other hand, these same teachers belong to an average of two other professional organizations (mean 2.065; SD 1.08; 95% C.I., 9.3%; N=123).

The Michigan Environmental Education Association (MEEA) sponsors workshops and an annual conference. The MEEA also publishes a highly informative monthly newsletter to keep its members informed and provide access to environmental education instructional techniques and materials. Although the MEEA's membership campaign is not aggressive, individual members commonly and frequently solicit the membership of those who show interest in conducting environmental education programs.

Those individuals who have been officers of the MEEA and active in its programs often have areas of special interest within the broad scope of environmental education. At the same time, these people often speak and publish as advocates of a holistic view. It would seem that such advocacy might influence MEEA members to think in more holistic terms than non-members. The summary contingency table analysis offered in Table 30 indicates little likelihood of such a correlation.

TABLE 30.

MEEA MEMBERSHIP--SUMMARY CONTINGENCY ANALYSIS,
CONTENT PERCEPTION BY MEEA MEMBERSHIP

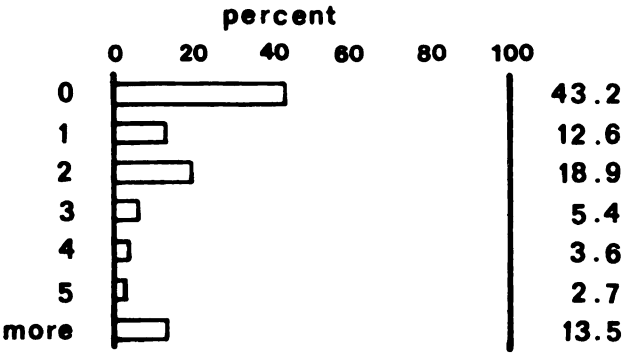
(N=123)	Member		Chi	X^2	phi	sign
Topic included	% no	% yes	square	sig.		
Conservation	77	23				
Ecology	77	23	.006	.94	.07	
Nature study	78	22	1.297	.25	.17	neg.
Outdoor education	78	22	.511	.47	.12	
Biology	76	24	.078	.78	.06	
Botany	79	21	.509	.48	.09	
Geology	80	20	3.337	.07	.19	neg.
Zoology	78	22	.001	.98	.02	
Agriculture	80	20	.925	.34	.11	
Geography	78	22	.006	.94	.03	
Chemistry	78	22	.000	.99	.02	
Economics	76	24	.011	.91	.03	
Health science	76	24	.042	.84	.04	
Nutrition	85	15	3.426	.06	.19	neg.
Animal husbandry	77	23	.005	.95	.01	
History	80	20	.290	.59	.07	
Vocational education	78	22	.000	.99	.02	
Family management	70	30	2.225	.14	.15	pos.
Business	76	24	.003	.96	.02	
Physics	77	23	.035	.85	.00	
Sociology	83	17	1.144	.28	.12	neg.
Physical education	72	28	.635	.43	.09	
Political science	79	21	.008	.93	.03	
Art	71	29	.977	.32	.11	
Math	74	26	.134	.71	.05	
Psychology	82	18	.355	.55	.08	
Language	83	17	.311	.58	.07	
Music	70	30	.305	.58	.08	

df=1

In this data array, the topics chosen as included in the individual TES Teacher's perception of the scope of environmental education are related to the membership of that individual in the MEEA. Even where there seems to be some demonstration of the existence of a correlation, based on the chi-square values, the phi values are very weak. In fact, correlation, however weak, tends to be negative, implying that MEEA membership encourages a somewhat reduced view of environmental education as encompassing a wide range of subject areas.

Environmental Education Practices Profile-- Involve Students Out-of-School

Involving students in out-of-school environmental education or environmental problem-solving activity was practiced by almost 57 percent of the responding Teachers. Not only did a majority of these TES Teachers involve their students in such activities, they tended to be involved more than once. Apparently such extracurricular involvement is found worth repeating, once tried. The distribution of frequency is shown in Figure 17.



Mean = 1.094
SD = 1.362
95% CI = ± .276, 25.2 %

Figure 17. Involved Students Out-of-School -- Number of Times Last Year

In evaluating the strength of 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 be some overlap with the preceding question about outdoor environmental learning experiences--the most likely would be to include class work off the school grounds. The intent of the second question was to be sure 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. The inclusion of off-the-school-grounds classwork does not diminish the value of the responses. The specification of students was intended to confine responses to the professional relationship of teacher-pupil.

Does the involvement of students in out-of-school environmental activity have any relationship with personal tendencies to become involved with public projects in the community? Table 31 would lead one to conclude that these TES Teachers need not participate on an individual basis in order to get their students involved, but it would seem to help somewhat. Note that the "yes" responses of Table 31 do not correspond with specific projects and do not identify the project of student involvement.

TABLE 31.

INVOLVED STUDENTS OUT-OF-SCHOOL--
CONTINGENCY TABLE ANALYSIS

(N=119) Participation in Public Projects (self-scaled)	Involved students, percent of total respondents		
	No	Yes	Total %
None	16.0	14.3	30.3
Cleanup	12.6	10.1	22.7
Cleanup and Beautification	5.9	9.2	15.1
Cleanup, Beautification and Environmental Protection	1.7	10.1	11.8
Beautification	2.5	5.9	8.4
Cleanup and Environmental Protection	1.7	4.2	5.9
Environmental Protection	. . .	4.2	4.2
Beautification and Environmental Protection	. . .	1.7	1.7
Total percent	40.3	59.7	

Chi square = 14.45; df = 7; significance = 0.044
Cramer's V = 0.349
Kendall's tau c = 0.325; significance = 0.0007
Pearson's r = 0.305; significance = 0.0004; r^2 = 0.093

Environmental Education Practices Profile--Consolidated Index

It was judged both useful and desirable to consolidate the several categories of information regarding TES Teacher practices in the conduct of environmental education (E.E.) into a single, arbitrary index. This index would allow convenient comparisons with other data and future group or individual measurements.

The following formula for determination of the Index value was used.

$$\text{E.E. Practices Index} = ((\text{Minutes}/60) + (\text{Outdoor Learning}) + (\text{Number times Involved Students}) + (\text{Workshops x 2}) + (\text{MEEA Membership}) + (\text{Perceived Content}/14)) \frac{100}{35}$$

The maximum value sequence within the formula is: variable to 30, 1, 6, 10, 1, 2. The mean formula values for the 1978 TES Teachers are: 0.95, 0.44, 1.09, 1.87, 0.42 and 1.16. The maximum value of the index is dependent on the contact time for individual teachers and may reach as high as 143. For convenience, a value of 15 was assumed a probable average maximum for the hours spent per week in environmental education to achieve a mode-maximum of 100. The acceptance of this Index is an arbitrary matter.

The amount of time spent conducting environmental education in the school program was considered of key importance in the structuring of an index. This value was converted from minutes per week to hours per week as a part of the

weighting process. This decision may be argued by others as offering excessive diminution of value. It will be seen that the potential value of time is very high even with the conversion.

Although a maximum value of 100 was desired for the index, if a holistic concept of environmental education was held by an individual teacher, the total teacher-pupil contact time might well be included in the environmental education time response. This would raise the maximum value of the index to a range of 114 to 143, based on the reported 25 to 30 hours total contact time. Although the use of an artificial system such as Z-scoring could be used, such a system precludes the ready use of intuitive interpretations and was rejected in favor of simpler interpretation potential.

Outdoor environmental learning experiences may be of several kinds. The yes or no response might then vary, dependent upon individual perception. Carrying classroom experience out of the classroom or adding a new facet to environmental learning by use of an outdoor "classroom" was considered valuable. Weighting this element for the number of times such experiences were conducted might place undue emphasis on it and would assume quality experiences equated with quantity. The singular weighting was judged sufficient and in balance with the other index elements.

At the same time, involving students in out-of-school environmental education or environmental problem-solving activities was judged of considerable importance. Quoting

from Michigan's Environmental Future,

> Environmental education is the basic process leading toward the development of a citizenry that is aware of and concerned about the environment and its associated problems, and that has the knowledge, skill, motivation, and commitment to work toward solutions to current and projected problems. (Governor's Task Force, 1973, p. 14)

In this context, it would be inconsistent not to rate out-of-school activities highly. This is a significant measure of the commitment of teachers to real-world problem-solving. Family considerations may restrict the individual teacher. Students, too, may have employment and activities subject to other schedules which reduce the opportunity for involvement. A high level of involvement thus becomes a measure of "motivation and commitment to work toward solutions to current and projected problems."

The conduct of effective environmental education requires an unusual breadth of knowledge and, for the average teacher, is not a part of ordinary teacher-training. Such abilities and skills may be developed through use of the variety of workshops and seminars available during the school year and vacation periods. Many specific techniques of special value may be acquired by means of these extra educational opportunities. The teacher who wishes to keep up-to-date in a particular subject area continues to take advantage of learning opportunities in that field and, indeed, seeks them out. This should be equally true in environmental education. Because of its wide-ranging nature, with constantly changing information availability, it is probably even more

important than with the customary academic areas. This index gives workshops attended double value, increasing the index value importantly with increased frequency of attendance.

Although membership in a professional association may be argued as of limited direct value to professional application of knowledge and skills, the Michigan Environmental Education Association serves as a clearing-house of application techniques and initiates many learning opportunities for the environmental educator. Membership in the MEEA has nothing to do with pay scales or fringe benefits, only the promotion of improved professional practices. Support of the MEEA through membership is a direct reflection of teacher commitment to excellence in the subject. Membership in the MEEA is, then, considered important to any value index of environmental education practices, although it should not be unduly weighted.

"Environmental education is total and comprehensive in its scope; it is a part of all subject areas and should be included at all grade levels," says the Michigan Department of Education (1973, p. 5). Therefore it is important that a teacher's perception of the scope of environmental education be included in any index of environmental education practices. The Content Perception previously measured and described is a part of this index. It is, however, given only modest weight. The measurement of practices should emphasize action rather than attitude. The application of some subjects to environmental education may have been somewhat obscure to

the responding teacher without experience in that field and thus might have been excluded from the list. Content perception was included in the index but reduced in value in order to emphasize the application, the behavior in the teaching process.

In the process of index evaluation, it was deemed advisable to determine if the time spent conducting environmental education exerted undue control on the index value or if, in fact, the time might serve in place of the Index. A bivariate correlation procedure relating the minutes per week with the Consolidated E.E. Practices Index produced a Pearson's product-moment correlation of -0.0315, an r^2 of 0.001, a significance of 0.365 and a Standard Error of estimate of 10.545 (N=123). The time would appear to have no special influence on the Index as a whole and would not, therefore, be an effective direct substitute for the Index. The scattergram produced from this procedure offered no intuitive correlation-tendency visually apparent.

However, the conduct of outdoor environmental learning experiences does show a modest correlation with the Index. A coefficient of 0.449, giving an r^2 of 0.202 (significance 0.001, N=94), suggests that those Teachers who conduct outdoor experiences may also score higher in the total Index value. This is not unexpected as such experiences may be reflected directly in other formula elements. The value of the correlation is sufficiently low that it appears to have no special influence on the Index. When tested with the time

spent on environmental education, the correlation with outdoor learning was only 0.109 (significance 0.14, N=100). This indicates that the conduct of outdoor learning experiences does not have a direct influence on the time spent in the classroom. In fact, some Teachers may believe that the outdoor experience is an effective substitute for classroom environmental education time.

The Consolidated Environmental Education Practices Index (E.E. Practices Index) includes quantity measures, commitment indicators, breadth of application indicators and professional training practices. It is considered a sound indicator for comparative purposes within this survey.

Environmental Education Practices Profile-- Correlation with Attitude

To determine if there was a correlation of significance between the attitudes and environmental education practices of these TES Teachers, a bivariate correlation procedure was performed using the previously devised Attitude Index and the E.E. Practices Index. Pearson's r correlations indicate little or no correlation between the two indexes used for the comparison, as shown in Table 32.

TABLE 32.

E.E. PRACTICES vs ATTITUDES

Pearson product-moment correlation (N=94)		
E.E. Practices Index with Attitude Index	Pearson's r	0.162
	r^2	0.026
	significance of r	0.060
	Standard Error of estimate	11.041

Hypothesis 2 states: There is no significant relationship between environmental education practices and environmental attitudes of the selected teacher population. The bivariate correlation procedure confirms this hypothesis.

Environmental Education Practices Profile-- "Urban" vs "Rural"

A further attempt was made to distinguish between TES Teachers living in high population density areas and those living in areas of low population density. As with the Attitudes and Personal Actions, urban was equated with city-suburb and rural with small town-country. Again, more precise delineations might have been drawn, but the general perceptions were considered adequate for this study and the distinctions in this area matched those used in analysis of attitudes.

The data analysis for each environmental education practices portion is displayed in Table 33. It is interesting that in all of the categories but one, the "urban" Teachers scored higher than the "rural" Teachers. Note, however, that the variability is very high and that these groups do not necessarily depict a simple random sample.

The low-density Teachers seem to spend considerably more time on environmental education in their school programs than the high-density Teachers, at least as they perceive it. The t-test indicates that the difference is not significant, but the specific means are quite emphatic. Although the difference between groups is high compared to the difference within groups and thus is adequate to reject the null hypothesis of equality for this population, the variability is still sufficient that inference of the differences to a larger population should not be made.

TABLE 33.

E.E. PRACTICES PROFILE--
"URBAN" vs "RURAL"

	Density (cases)	Mean	SD	95% C.I.		F	p	df	t	p	Sig.
				+ or -	%						
Minutes weekly in school program	Hi (46) Lo (48)	43.33 65.98	52.66 76.16	15.64 22.12	36.1 33.5	2.43	.003	81.8	0.15	.885	N.S.
Conduct school outdoor learning	Hi (59) Lo (57)	0.847 0.649	0.363 0.481	0.094 0.128	11.1 19.7	1.76	.034	104.	2.50	.014	V.S.
Involve students out-of-school	Hi (59) Lo (57)	0.661 0.526	0.477 0.504	0.124 0.133	18.8 25.3	1.11	.686	114.	1.48	.142	N.S.
Frequency out-of-school	Hi (48) Lo (47)	1.208 1.000	1.352 1.383	0.392 0.406	32.5 40.6	1.20	.497	107	0.54	.592	N.S.
Attend environ. ed. workshops	Hi (62) Lo (58)	0.661 0.466	1.070 0.754	0.272 0.199	41.1 42.7	2.01	.008	110	1.16	.247	N.S.
Member MEEA	Hi (62) Lo (58)	0.226 0.207	0.422 0.409	0.107 0.108	47.3 52.2	1.06	.814	118	0.25	.804	N.S.
Consolidated E.E. Practices Index	Hi (48) Lo (46)	19.56 15.24	14.23 10.84	4.13 3.22	21.1 21.1	1.74	.065	92	1.67	.099	see text

N.S. = Not Significant
V.S. = Very Significant

The geographical proximity may well make low-density Teachers more aware of the biophysical environment around them. Although their environmental education content perception is not higher than "urban" Teachers (see Table 11, page 95), they may spend more time with environmental emphases in curriculum areas related to these biophysical surroundings.

"Rural" Teachers measured do not, however, conduct outdoor learning experiences as often as "urban" Teachers. This is not illogical considering that in urban areas the absence of biophysical sites not severely altered by human technology would encourage indulgence in "field trips" and increase the apparent value of more nearly natural areas for those teachers who want their pupils to encounter biophysical nature first-hand. Both statistical tests of this segment are significant and indicate that this particular group of TES Teachers may be considered representative of a larger population. The distinction between "urban" and "rural" TES Teachers is considered clearly made on this point, both for the specific group and by inference to a similar, larger population.

The involvement of students in out-of-school environmental education or environmental problem-solving may be influenced by several factors, two of which stand out. Opportunity may vary widely from place to place. The cognitive levels of Teachers may vary widely so that even recognition of opportunity may be problematic. These points are related, of course, and it is possible that the TES

workshop experience may improve the ability to recognize opportunity. The higher mean scores of high-density Teachers are accompanied by high variability within groups and thus the urban-rural distinction is not well-drawn as evidenced by the low F value and associated probability.

Availability is very likely a strong influence on the workshop attendance score. The distinct difference between these populations is not clear enough to extend to larger populations. Geography and transportation undoubtedly affect the frequency of attendance at special workshops. It may be, too, that "rural" Teachers see less need for assistance in conducting environmental education.

The Consolidated Environmental Education Practices Index shows a decided difference between these two groups with those TES Teachers living in high density areas scoring more than 28 percent higher than their low density counterparts. If a p value of .10 is accepted as a significant difference, then the null hypothesis of equality must be rejected for both the specific groups measured and a larger population of which this is a sample. If a lower p value is demanded, the rejection is not in order, with the qualification that a Type II error may result. The researcher has chosen an acceptable level for significance as .05 and therefore does not accept the differences between the two groups as statistically significant. A factor of importance in this decision is the large variation of the 95% confidence interval signifying that this TES Teacher group only

approaches being an adequate simple random sample. Additionally, the standard deviation is much higher than preferred, being at least two-thirds of the mean score value.

Hypothesis 7 states: There is no significant difference between urban and rural segments of the selected population in attitudes, personal actions or professional practices. The comparisons displayed in Tables 11, 22 and 33 confirm that, with one exception noted on page 160, for the surveyed population there is no significant difference. Further, the variability within each group is sufficiently great that any differences which might appear may well be statistical artifacts of little or no inferential value.

CHAPTER IX

CONTINUING INFORMATION SOURCE PROFILE

The consensus among leaders in environmental education has been well-expressed in Michigan's Environmental Future: "No one can escape environmental education . . . . Everyone learns about the environment." The report then asked a pertinent question: "But exactly what are people learning?" (Governor's Task Force, 1973, p. 2). That highly respected report did not attempt to detail the sources of information content to which "everyone" was exposed. It did recognize that, at the time of publication, research was and would continue to be needed to determine the most effective mechanisms for communication about environmental matters to all populations.

As a step in determining effective communication mechanisms, this current study queried the 1978 TES Teachers as to their continuing information sources. Emphasis was placed on the four mass media of radio, television, newspapers and magazines. Although other media might have been included, these four were selected as being readily available and widely used by all citizens. Additionally, these media offer a continuing source of reasonably current information. They also conform with Capps' recommendations

in 1939, substituting television for its counterpart of that time, motion pictures. Books on environmental matters were considered to be rapidly outdated and probably used intermittently, except perhaps as reference, within the reading milieu of teachers.

The three aspects of special interest in this study were: amount of exposure to mass media of these TES Teachers, the perceived value of these media as sources of environmental information, and the information source most likely to be believed when conflicting information about the environment was encountered on a day-to-day basis.

The profile of Continuing Information Sources as perceived by these TES Teachers is presented in Figure 18.

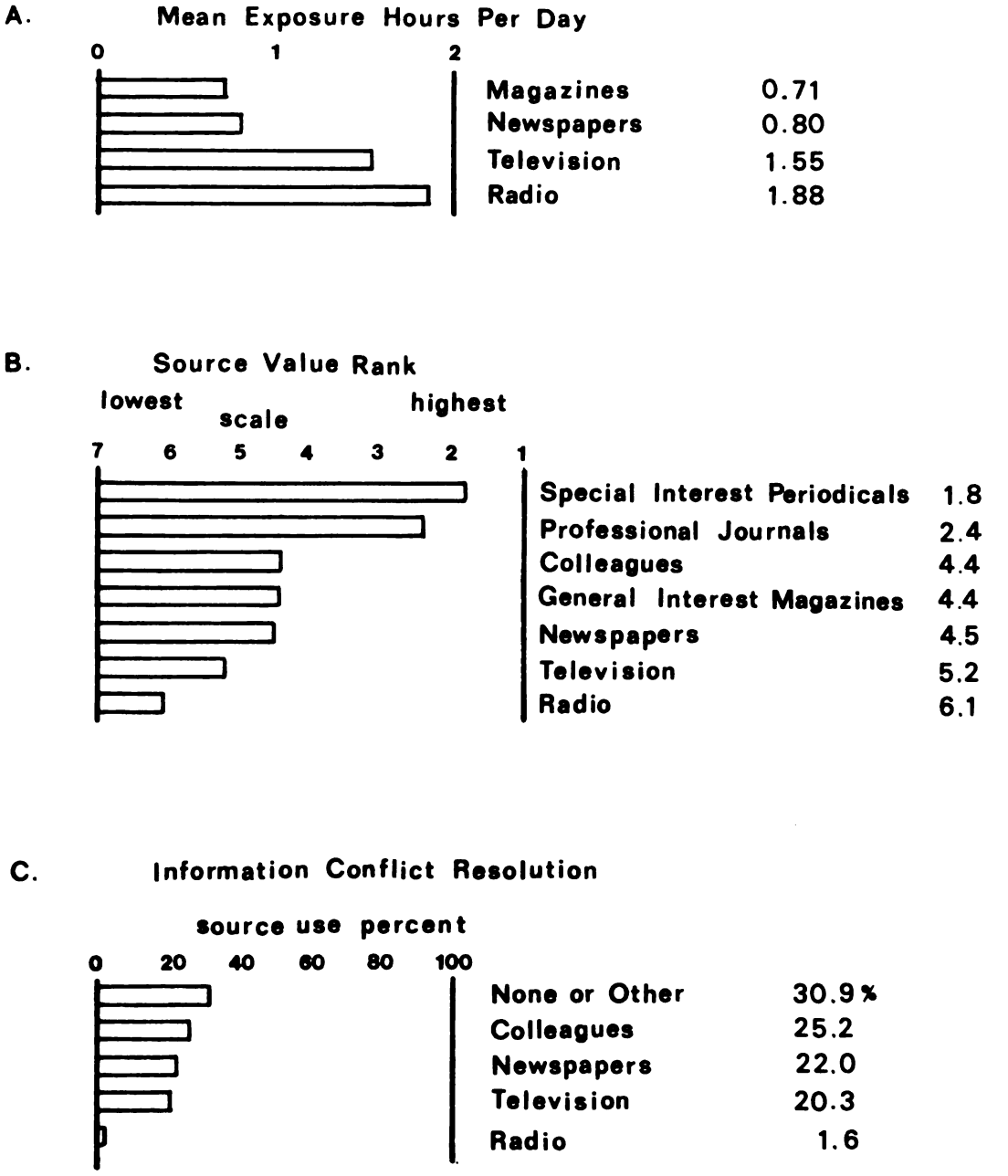


Figure 18. Continuing Information Source Profile

Continuing Information Source Profile-- Exposure Quantity per Day

The TES Teachers were asked to report the total time per day spent with each of the four mass media listed. Their replies are summarized in Table 34.

The first point of interest is the high incidence of use, noted in the column labelled "Users %." The figures in this column represent the percentage of these Teachers reporting the use of each medium on a daily basis. These Teachers may be considered regular, almost steady users of all four media.

Some qualification of the time quantities reported is in order. The radio or television may be "on" without much attention directed to the content. Magazines may be perused for their pictures rather than their verbiage. Newspapers may be selectively read for other than general news content. The quantity of exposure indicated here is not necessarily an indicator of the quality of the exposure. Also, the reported time is probably an attempt to average rather than actual daily exposure, which attempts would be subject to many memory and interpretation vagaries.

While the mean perceived exposure values have import, despite their limitations, a more thorough picture is presented in Figure 19 where the frequency distributions are displayed for each medium. It appears that some of these Teachers spend a great deal of time with the print media, more than might be expected. Perhaps this is a

TABLE 34.

CONTINUING INFORMATION SOURCE PROFILE--
MINUTES PER DAY WITH MEDIUM

	N	Mean	SD	95% C.I.		Mean hours	Users %
				+ or -	%		
Magazines	122	42.484	35.254	6.319	14.9	0.708	95.9
Newspapers	123	47.846	27.803	4.963	10.4	0.797	94.3
Television	123	93.049	56.943	10.164	10.9	1.55	93.5
Radio	122	112.992	138.358	24.799	21.9	1.88	87.7

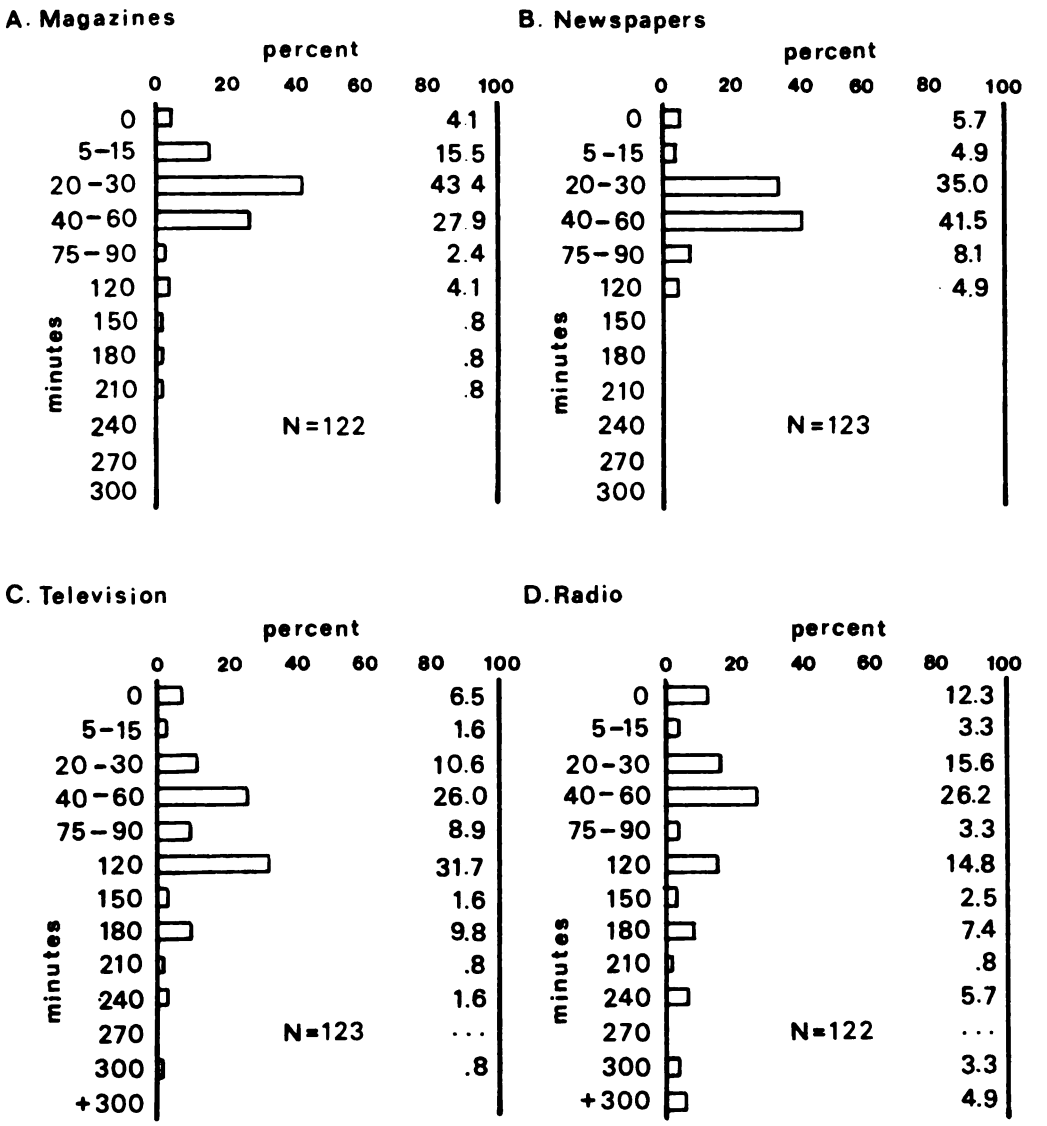


Figure 19. Media Exposure Minutes per Day

reflection of the perceived status of print instead of a measure of actual exposure.

Figure 20 displays exposure times of both print media combined and of both electronic media combined. These combined figures show that less than five percent of these Teachers spend more than three hours per day with both magazines and newspapers, but over 35 percent spend more than three hours with radio and television combined. A considerable amount of discretionary time is spent in the company of the electronic media.

Within the electronic media exposure time of these respondents, further inquiry was made as to the number of times per day each respondent watched television news or listened to radio news. The frequency distribution of responses for each medium is displayed in Figure 21.

It is notable that whereas 12.3 percent of the respondents did not listen to radio at all, an additional 6.2 percent of the listeners did not listen to radio news broadcasts, presumably confining their listening to entertainment programming. Further, with 6.5 percent of these Teachers not watching television, an added 6.6 percent avoided television news for a total of 13.1 percent of these Teachers not watching television news.

It seems that news broadcasts are not an especially important part of broadcast programming to these Teachers.

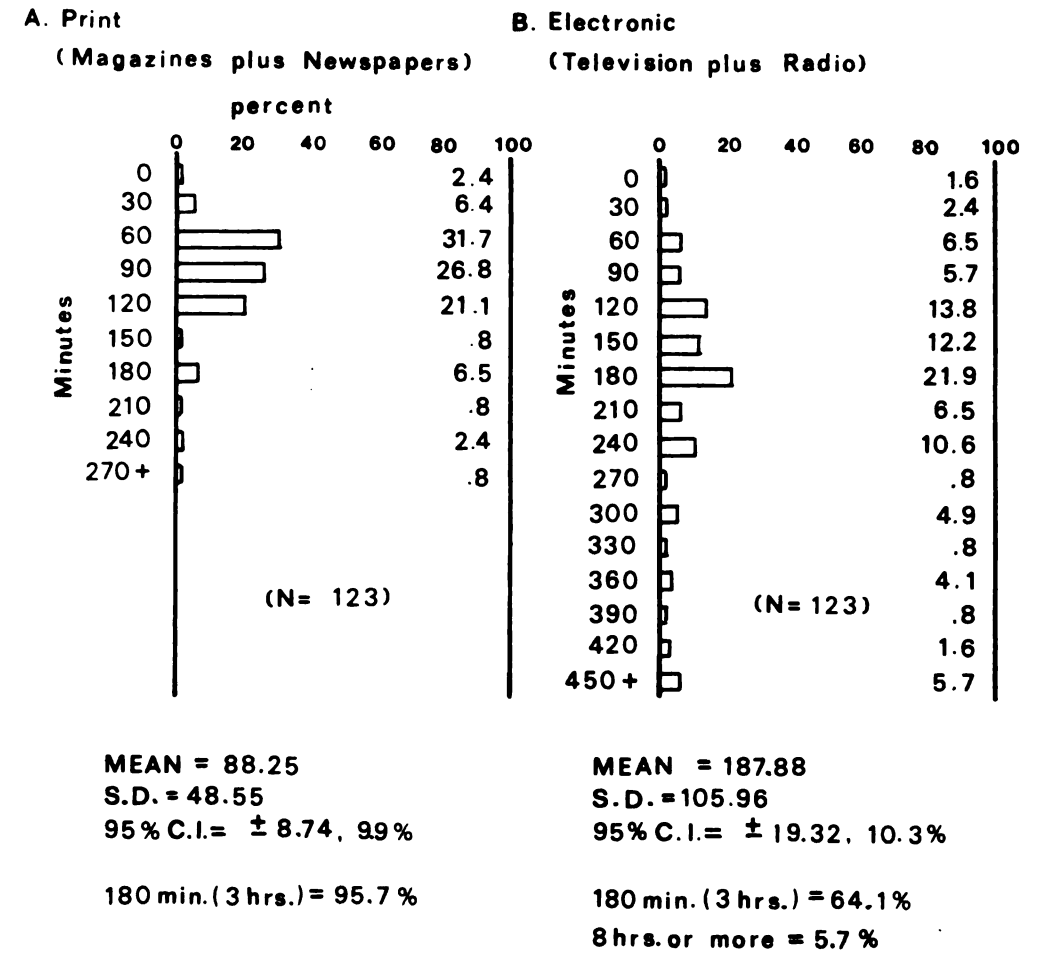


Figure 20. Combined Electronic Media and Print Media Exposure Minutes Per Day

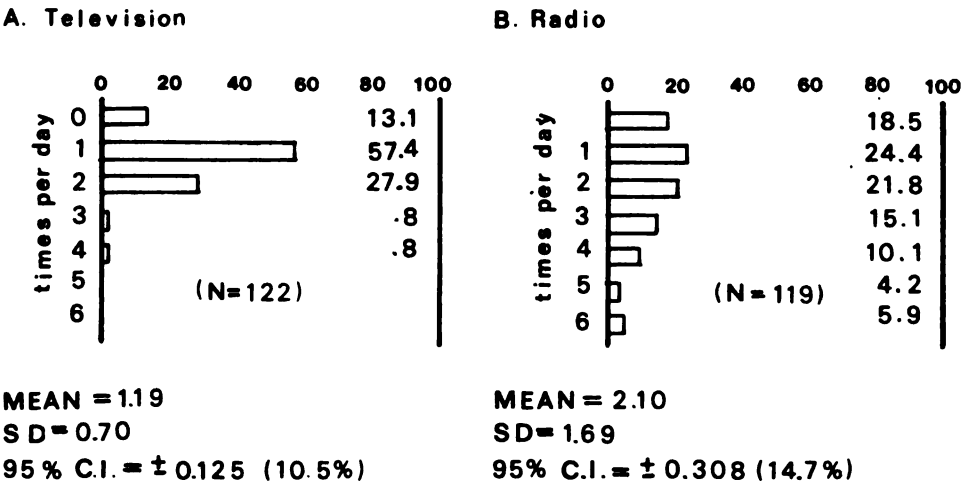


Figure 21. News Exposure Times per Day Electronic Media

Continuing Information Source Profile-- "Urban" vs "Rural"

As with the Attitudes, Personal Actions and Environmental Education Practices sections of this study, distinctions between Teachers living in high population density areas and those living in areas of low population density were investigated as to media exposure patterns. Again, urban was equated with city-suburb and rural with small town-country.

The data analysis for each of the four media is displayed in Table 35. All four media attracted more time from "urban" consumers than "rural," but the variability is quite high. These groups do not necessarily depict a simple random sample.

Only one of the four media exhibits a statistically significant difference, according to the t-test. Those TES Teachers living in high population density areas spend 25 percent more time with newspapers than do their low population density counterparts. This may reflect the availability of a local daily newspaper. Locally published daily newspapers are not as ubiquitous as electronic news media. Also, the time spent with newspapers may be more a function of product-consumption interest than information-consumption interest.

TABLE 35.

CONTINUING INFORMATION SOURCE PROFILE--
MINUTES PER DAY WITH MEDIUM,
"URBAN" vs "RURAL"

	Density (cases)	Mean	SD	95% C.I. approx.		F	p	df	t	p	Sig.
				+ or -	%						
Magazines	Hi (62) Lo (57)	41.90 40.61	36.46 31.88	9.26 8.46	22.1 20.8	1.31	.310	117	0.20	.838	N.S.
Newspapers	Hi (62) Lo (58)	52.42 41.81	29.54 24.99	7.50 6.57	14.3 15.7	1.40	.203	118	2.12	.036	S.
Television	Hi (62) Lo (58)	95.32 91.55	61.10 53.07	15.52 13.96	16.3 15.2	1.33	.284	118	0.36	.720	N.S.
Radio	Hi (62) Lo (57)	117.66 109.65	132.42 148.42	33.63 39.38	28.6 35.9	1.26	.383	117	0.31	.756	N.S.

N.S. = Not Significant
S. = Significant

The data in Table 36 were drawn to array the number-of-times-per-day exposure to the electronic news media. Newspapers were excluded as they presented serious questions of availability. Again, the urban-rural differences were not statistically significant, although there do appear to be some differences in the media consumption patterns.

TABLE 36.

NEWS EXPOSURE TIMES PER DAY--
"URBAN" vs "RURAL",
ELECTRONIC MEDIA

	Density (cases)	Mean	SD	95% C.I.		F	p	df	t	p	Sig.
				+ or -	%						
Television	Hi (62) Lo (57)	1.113 1.246	0.680 0.714	0.17 0.19	15.5 15.2	1.10	.707	117	-1.04	.301	N.S.
Radio	Hi (61) Lo (55)	2.344 1.764	1.622 1.688	0.42 0.46	17.7 25.9	1.42	.185	115	1.37	.173	N.S.

N.S. = Not Significant

Continuing Information Source Profile--Magazine Reading

The broad scope of this study limited identification of attention-to-content in all four media. However, as a mechanism was readily available for identifying attention-to-content in magazines, this medium was investigated more closely.

Magazines were read by more than 95 percent of the TES Teachers, a higher use-percent than the other three media. Whereas the mean exposure time per day was less for magazines than for the other media, magazines often provide greater depth of coverage of their content and have important value as reference material. As Schramm notes in "The Nature of an Audience" (1977), magazine readers tend to be seeking more depth of information when they read; children turn to magazines and books when they seek information rather than entertainment.

In treating magazine-reading habits, it is important to identify the content of the material read. The respondents were asked to name the "periodicals, journals and magazines" they read regularly, for later categorization by the researcher. Eight categories were subsequently defined. This mechanism allows a classification of content, identifying the most prominent type of information. The system for categorization is described in Appendix F and the lists of titles are in Appendix G.

The periodical categories and their abbreviated titles are listed in Table 37.

TABLE 37.

PERIODICAL CATEGORIES

Category	Abbreviated title
Professional Journals with Biophysical Emphasis	Prof. Journ. Biophysical
Professional Journals with Methods or Technological Emphasis	Prof. Journ. Meth. & Tech.
Special Interest Magazines with Generalized Natural History or Environmental Emphasis	Spec. Int. Nature, Environ.
Special Interest Magazines with Outdoor Activities and Sports Emphasis	Spec. Int. Sports
Special Interest Magazines with Science and Technology Emphasis	Spec. Int. Sci. & Tech.
Special Interest Magazines with Other Emphases	Spec. Int. Other
General Interest Magazines with News Emphasis	Gen. Int. News
General Interest Magazines with Features Emphasis	Gen. Int. Feature

The popularity of each category is displayed in Figure 22. Popularity was determined simply by finding the percentage of respondents indicating that they regularly read in the particular category. While unsophisticated, the simple frequency of regular exposure to the content offers

a fairly well defined picture of reading tastes in these periodical categories.

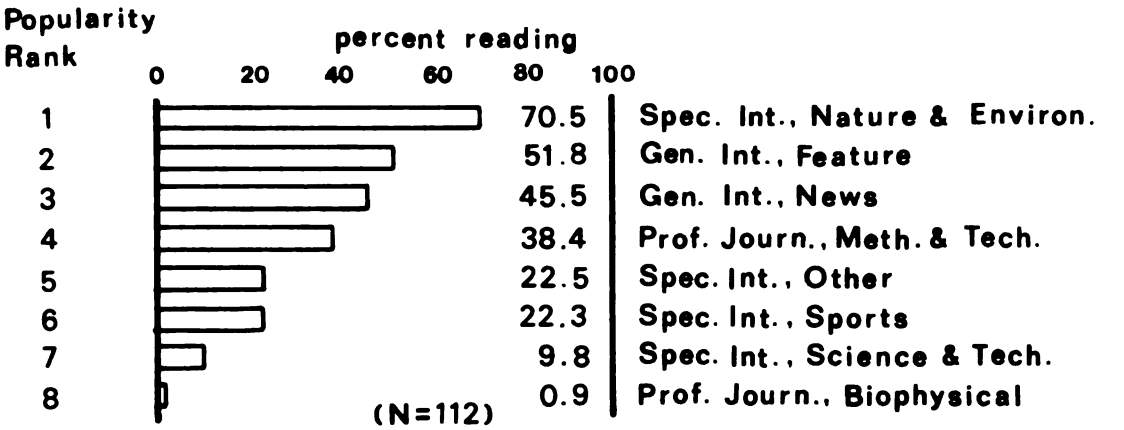


Figure 22. Periodical Reading by Category

Expected by the researcher, the natural history and general environmental information magazines ranked higher than all other categories for this self-selected group of teachers. It is noteworthy that less than 40 percent of these Teachers read professional journals regularly, which category includes those periodicals aimed directly at teachers and designed to assist them in improving their professional performance.

Cosmopolitan interests are suggested in the fairly high frequency of exposure to the two categories of general interest magazines, News and Features. In fact, when these two categories are combined, 69.6 percent regularly read in one or both categories. Spec. Int. Nature, Environ. then becomes essentially equal to the combined general interest magazines.

The scope of readership within each category is shown in Table 38 with some respondents reading as many as six publications within a single category. Nor is this range especially misleading, as is often the case with range data. The extremely high variation from mean shown by the standard deviation suggests that, for these Teachers, reading one periodical in a category often leads to reading several more publications in the same category. Inspection of raw frequency data supports this conclusion.

Numbers of contacts are only the beginnings of quantity evaluation. The time spent with each periodical category expands this evaluation potential and also offers some indication of the "quality" of the contacts. The hours spent with each periodical category each month are arrayed in Table 39. Again, the SD is so extreme for each category that one is led to conclude that if these Teachers read in the category at all, they will spend a considerable amount of time in it and are thus rather dedicated consumers of the content--whatever its nature.

Comparison of Tables 38 and 39 shows the same order of categories with the single exception of Gen. Int. News, doubtless a result of its weekly frequency of publication.

Combining number of magazine titles read per month and the hours each month spent with magazines provides an approximate measure of magazine use intensity in each category, or the thoroughness with which these magazines are read. Results of this analysis are summarized in Table 40.

TABLE 38.

PERIODICALS READ, NUMBER EACH CATEGORY

Category by mean rank	N	Range	Mean	SD	95% C.I.	
					+ or -	%
Combined Gen. Int.	112	N.A.	1.536	1.542	0.29	18.8
Spec. Int. Nature, Environ.	112	0-6	1.482	1.369	0.26	17.3
Gen. Int. Feature	112	0-5	0.964	1.266	0.24	24.6
Prof. Journ. Meth. & Tech.	112	0-5	0.723	1.067	0.20	27.7
Gen. Int. News	112	0-2	0.571	0.694	0.13	22.6
Spec. Int. Sports	112	0-4	0.384	0.830	0.16	40.6
Spec. Int. Other	112	0-3	0.288	0.594	0.11	38.5
Spec. Int. Science & Tech.	112	0-5	0.161	0.609	0.11	70.8
Prof. Journ. Biophysical	112	0-1	0.009	0.094	0.02	200.0

N.A.=Not applicable

TABLE 39.

HOURS READING PERIODICALS
PER MONTH, BY CATEGORY

Category by mean rank	N	Range	Mean	SD	95% C.I.	
					+ or -	%
Combined Gen. Int.	111	0-40	5.198	6.623	1.25	24.0
Spec. Int. Nature, Environ.	111	0-20	2.784	3.402	0.64	23.0
Gen. Int. Feature	112	0-28	2.482	4.058	0.76	30.6
Gen. Int. News	110	0-20	2.355	3.883	0.73	31.2
Prof. Journ. Meth. & Tech.	112	0-20	1.411	2.776	0.52	36.9
Spec. Int. Sports	111	0-20	1.000	2.796	0.53	52.6
Spec. Int. Other	112	0-12	0.768	1.898	0.36	46.4
Spec. Int. Science & Tech.	112	0-8	0.357	1.341	0.25	70.3
Prof. Journ. Biophysical	112	0-3	0.027	0.283	0.05	196.3

TABLE 40.

INTENSITY OF PERIODICAL USE BY CATEGORY

Category by Intensity Rank	Mean hours per month	Mean minutes per month	Mean number of titles	Mean hrs. per title per month
Gen. Int. News	2.355	141.3	0.57	4.12
Combined Gen. Int.	5.198	311.9	1.54	3.38
Prof. Journ. Biophysical	0.027	1.6	0.01	3.00
Spec. Int. Other	0.768	46.1	0.29	2.67
Spec. Int. Sports	1.000	60.0	0.38	2.60
Gen. Int. Feature	2.482	148.9	0.96	2.57
Spec. Int. Science & Tech.	0.357	21.4	0.16	2.22
Prof. Journ. Meth. & Tech.	1.411	84.7	0.72	1.95
Spec. Int. Nature, Environ.	2.784	167.0	1.48	1.88
Factored Gen. Int. News	0.589	35.3	0.14	0.95

The categories are ranked, in Table 40, according to mean hours per title per month--the intensity of use per title. The order is quite different from that in Tables 38 and 39. Now Gen. Int. News receives the most intensive use, probably again a function of its weekly frequency. However, this quantification is a strong indication that a large amount of information may be acquired, or at least encountered, with potential for considerable reinforcement from such intensive use. By the same means of evaluation, the reduction to last place of Spec. Int. Nature, Environ. seems to indicate that consumption in this category may be rather superficial.

When Gen. Int. News is factored by publication units per month, divided by four and one-third to arrive at an approximation of hours per issue, the units are quite different. The reversal of rank resulting from this factoring does not reduce the significance of the News category. The total exposure must still be considered in evaluating the impact of these categories.

The effect of Prof. Journ. Biophysical is low in spite of its intensity rank. There was, in fact, only one reader in this category. Curiosity as to which of the titles received such dedication prompted the researcher to sort through each of the questionnaires. Science magazine, a weekly publication of the American Association for the Advancement of Science, emerged. Readers of this magazine will agree that three hours per month is not an overestimate.

The detailed significance of the values contained in Tables 38, 39 and 40 will be of value in further research and application of the data. Additional discussion of detail is beyond the scope of this report.

A general conclusion is that those who read magazines are probably rather dedicated readers. Considering the time spent with each issue, these readers may be assumed to be consuming more than the advertisements. Editorial content of magazines is, then, important in the total information input to these Teachers and no category of publication should be considered unimportant.

Continuing Information Source Profile-- Quantities and Correlations

To determine if there was a correlation of statistical significance between media exposure and the index variables of Attitudes, Personal Actions and Environmental Education Practices of these TES Teachers, several bivariate correlation procedures were performed.

The previously determined indexes were used for this purpose as these are considered valid summary indicators. Within each index, specific factors may show strong correlations. However, the overall attitudes, actions and practices are the matters under consideration in this study and the indexes were designed to consolidate and rationally weigh the pertinent factors.

The relationship of measured attitude and exposure to each of the four media shows no correlation between the Attitude Index and the minutes per day spent with each medium. The Pearson's product-moment correlations are shown in Table 41.

When the Personal Action Index is related to the media exposure times, shown in Table 42, only the Pearson's r of magazine exposure is large enough to suggest there might be some correlation.

The terminology of Guilford (1950) is useful in turning these Pearson's r values into verbal descriptions having some intuitive meaning.

TABLE 41.

ATTITUDE INDEX vs MEDIA EXPOSURE

Attitude Index with:	N	Pearson's r	r^2	sig.	Standard Error
Magazine exposure	122	0.028	0.0008	0.379	10.59
Newspaper exposure	123	0.076	0.006	0.203	10.52
Television exposure	123	- 0.032	0.001	0.365	10.54
Radio exposure	120	0.028	0.0008	0.382	10.59

TABLE 42.

PERSONAL ACTION INDEX vs MEDIA EXPOSURE

Action Index with:	N	Pearson's r	r^2	sig.	Standard Error
Magazine exposure	121	0.248	0.061	0.003	23.87
Newspaper exposure	122	0.078	0.006	0.195	24.50
Television exposure	122	- 0.042	0.002	0.325	24.56
Radio exposure	119	- 0.003	0.000	0.487	24.70

Guilford suggests:

less than .20	slight, almost negligible relationship;
.20 - .40	low correlation, definite but small relationship;
.40 - .70	moderate correlation, substantial relationship;
.70 - .90	high correlation, marked relationship;
more than .90	very high correlation, very dependable relationship.

Thus the .248 correlation in Table 42 can be described as a definite but small relationship. The same may be said for the radio exposure correlation with the E.E. Practices Index shown in Table 43.

With data available, it was possible to further explore the correlation between magazine reading and personal actions which might then reveal some especially strong effects of particular print-vehicle categories. The bivariate correlation procedure summarized in Table 44 was performed.

The Pearson's r values of Table 44 indicate that no one particular category of magazines has a relationship affect with the Personal Action Index. The conclusion, then, is that any relationship is a product of cumulative exposure rather than specific exposure.

Considering the possibility that the lack of correlation between overall magazine exposure and the other two indexes, Attitudes and E.E. Practices, might be concealing some correlation with specific categories of magazines, the

TABLE 43.

E.E. PRACTICES INDEX vs MEDIA EXPOSURE

E.E. Practices Index with:	N	Pearson's r	r^2	sig.	Standard Error
Magazine exposure	93	- 0.021	0.0004	0.422	12.88
Newspaper exposure	94	- 0.117	0.014	0.130	12.77
Television exposure	94	- 0.098	0.010	0.174	12.80
Radio exposure	91	0.251	0.063	0.008	12.32

TABLE 44.

PERSONAL ACTION INDEX vs MAGAZINE GROUPS

Action Index with:	N	Pearson's r	r^2	sig.	Standard Error
Professional Journals	111	- 0.039	0.002	0.342	23.28
Nature or Environment	110	0.188	0.036	0.024	22.97
Other Special Interest	110	- 0.029	0.001	0.381	23.38
All Special Interest	110	0.107	0.011	0.133	23.26
General Interest	110	0.0008	0.0000	0.497	23.39

two correlation procedures shown in Tables 45 and 46 were performed. From these it becomes clear that there are, with one exception, nearly negligible relationships, especially when the significances of the values are considered.

The one exception is the correlation of the E.E. Practices Index with readership in the Nature, Environ. category. Although this may be considered a definite relationship in the Guilford terms, the value is considered by this researcher to be too small to have importance. It is, of course, possible that one or more particular factors making up the Practices Index may show a high correlation with this category, but such breakdowns of data are beyond the intent of this study.

TABLE 45.

ATTITUDE INDEX vs MAGAZINE GROUPS

Attitude Index with:	N	Pearson's r	r^2	sig.	Standard Error
Professional Journals	112	- 0.105	0.011	0.136	10.66
Nature or Environment	111	- 0.024	0.001	0.403	10.77
Other Special Interest	111	- 0.025	0.001	0.396	10.77
All Special Interest	111	- 0.035	0.001	0.357	10.76
General Interest	111	0.020	0.000	0.418	10.77

TABLE 46.

E.E. PRACTICES INDEX vs MAGAZINE GROUPS

E.E. Practices Index with:	N	Pearson's r	r^2	sig.	Standard Error
Professional Journals	89	- 0.122	0.015	0.127	12.62
Nature or Environment	88	0.221	0.049	0.019	12.36
Other Special Interest	88	- 0.062	0.004	0.283	12.65
All Special Interest	88	0.144	0.021	0.090	12.54
General Interest	88	- 0.112	0.013	0.149	12.60

Continuing Information Source Profile-- Source Evaluation

Although the quantity of exposure to mass media information sources has important relevance to a determination of communication effects, the audience perceptions of quality in the exposure must not be overlooked and were therefore examined in this study.

The 1978 TES Teachers are self-selected groups of a distinctive population. They may indeed represent a sample of two populations: of teachers in general who have a special interest in environmental affairs, and of a general population of citizens with a special interest in environmental affairs and with advanced levels of education.

Queries in various forms as to the credibility of information sources is a research tradition in the communication field. It was determined at the time this survey was formulated that other measures also had merit and should be included as well. As this study was to serve as a base for subsequent refinement, other forms of perceived source-value responses were explored. Due to questionnaire length strictures, the interrelating questions originally devised were excluded and some desirable elements of the systematic approach could be added in future studies of details in this area. Each of the evaluation question types will be treated separately and synthesized at the end of this section.

Credibility rating

Respondents were asked to indicate their credibility rating of several subdivisions of the electronic mass media on a seven segment scale. The range was labelled only Not Credible at one end and Very Credible at the other.

Quantity of "cut-points" on such a scale has been suggested as influencing respondents toward midpoint responses (Coombs and Coombs, 1976-77). It is believed that, for this question in which comparisons were offered and implicitly requested, influence on the degree of "spread" had less undesirable effect than a scale of fewer cut-points which might create some confusion, at least in subsequent coding. Also, the educational level of these respondents suggested that the influence might be less than for another, less well-educated population. At any rate, convenience, both in responding and in later coding, was the factor which favored the distinctive segmentation over the unproved possibility of undue influence.

Several questions were asked relative to the use and perceptions of the Cooperative Extension Service (CES) and its publications. One of these questions asked for a credibility rating of the CES. This question followed closely, in the questionnaire, the other credibility rating questions but was not a part of the "comparative" structure. Too, the rating was asked only of those who indicated that they were acquainted with the CES. As the CES rating must

thus be considered a non-comparative response, the rank position should be viewed with some reservation if the values are to be extended to other or larger populations. However, the frequency distribution proved to be such that the tolerated error at the 95 percent confidence interval (4.7%) lends considerable credence to its first ranking.

The credibility ratings are arrayed in Table 47. These ratings are also displayed in Figure 23.

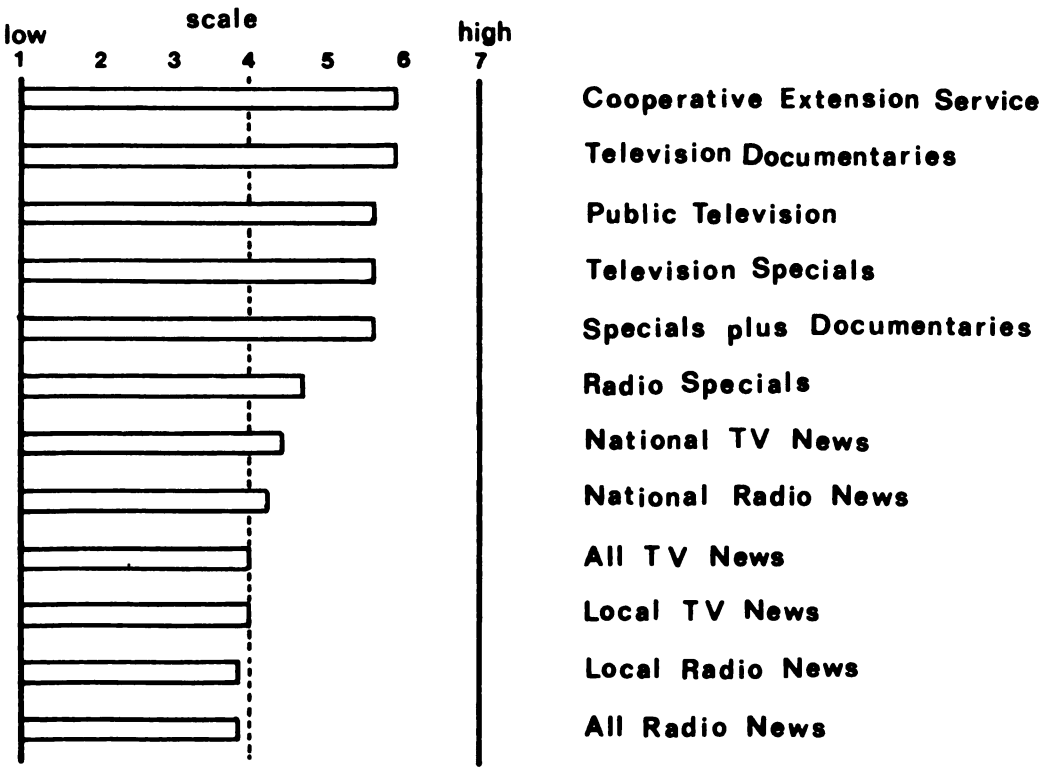


Figure 23. Credibility Rating

TABLE 47.

CREDIBILITY RATING

	Rank	N	Mean	SD	95% C.I.	
					+ or -	%
Cooperative Extension Service*	1	56	5.98	1.05	0.28	4.7
Television documentaries	2	117	5.96	1.10	0.20	3.4
Public television	3	111	5.64	1.33	0.25	4.5
Television specials	4	115	5.61	1.17	0.22	3.9
Combined specials and documentaries**	5	115	5.59	1.12	0.21	3.7
Radio specials	6	97	4.68	1.20	0.24	5.2
National TV news	7	115	4.38	1.27	0.24	5.4
National radio news	8	109	4.22	1.19	0.23	5.4
All TV news***	9	114	4.03	1.12	0.21	5.2
Local TV news	10	114	4.00	1.18	0.22	5.4
Local radio news	11	110	3.90	1.23	0.23	6.0
All radio news***	12	108	3.88	1.10	0.21	5.4

* Non-comparative response--see text
** Computer assisted synthesis ((S + D) / 2)
*** Computer assisted synthesis ((N + L) / 2)

Inspection of Figure 23 leads one to conclude that, for these Teachers, the electronic media may be divided into two major groupings as to credibility. Television documentaries, special programs and public television make up the more credible group. Television news and radio news make up the less credible group. Radio "specials" may have suffered due to perception as expanded news programs rather than distinctly special programs.

The combined visual and aural impact of television was recognized and anticipated. The researcher expected, however, that dramatized versions of information presentation would be viewed by this audience with more skepticism than the brief but "straighter" news broadcasts, especially of radio. It seems that either the more thorough coverage or the dramatic entertainment style, or both, of the longer programs adds very importantly to credibility. Perhaps the pseudo-dramatic style of news broadcasters detracts from their credibility.

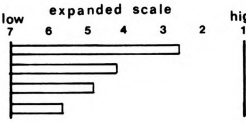
Objectivity Rank

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 considered desirable to use a common denominator for comparative purposes. The premise was therefore adopted that this population could identify and evaluate the reporters of information for the four media and that the reporters could then serve as the comparative base across the media.

By emphasizing the reporter, this base might tend to reduce the influence of visual materials and other aspects of physical 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. The four-rank scale was expanded for the sake of illustration in order that comparison with other, seven-point scales would be simplified.

Although the resulting device is quite unsophisticated, the ranking displayed in Figure 24 from data in Figure 25 offers intuitive support for its validity. Figures 24 and 25 also demonstrate that, while objectivity perceptions may be fairly well-measured by this device, its value as a comparative measure for all media, bypassing other dimensions, is negligible.

The magazine writer ranked first by a considerable



	expanded value
Magazine Writer	2.68
Newspaper Reporter	4.25
TV News Reporter	4.84
Radio News Reporter	5.68

Figure 24. Objectivity Rank

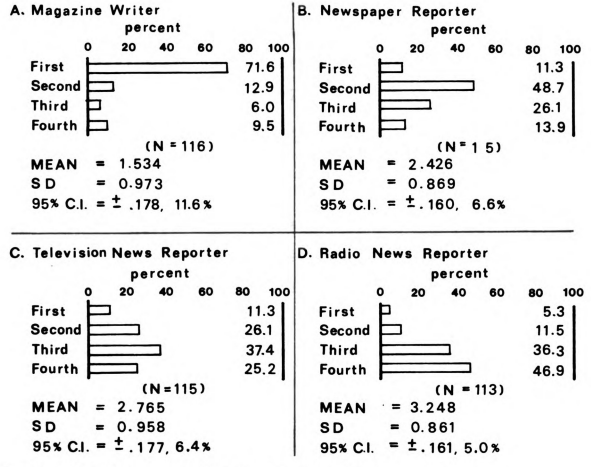


Figure 25. Objectivity Rank Distribution

margin in the evaluation of relative objectivity. There may be two particular factors at work in this. The length of a magazine article allows inclusion of a considerable number of facts and thorough exploration of relationships. The other three media are more abbreviated in their content.

The second factor is selectivity, in the seeking of information and in perception. Through their reading habits revealed in this survey, it appears that these teachers read those magazines which appeal to their special interests. It would be naive to assume they read randomly. It is more likely they select magazine reading purposefully, with a predisposition to believe and value the content of their selections. It would then be expected that they could do no less than cast a strong vote of confidence in magazines.

Other sources may be viewed as more ubiquitous with less personal responsibility; it is necessary to accept the whole package offered by other media, selectively "editing" content. A lower ranking is then permissible.

News reporters, especially newspaper reporters, voice pride in their reportorial objectivity. This teacher audience obviously does not share the view wholeheartedly. On the other hand, newspaper reporters may take heart in that they outranked television news reporters despite the latter's advantage of visual contact. Perhaps the intellectual commitment to reading the printed word plays an important role here. The facelessness and low listener-involvement of radio undoubtedly contributed to its relegation to last place.

Just as effort was made to determine if there were significant differences between urban and rural TES Teachers in their quantity of use, so objectivity ranking was tested. The results, displayed in Table 48, show a significant difference only for newspaper reporters with low population density respondents viewing them more favorably. This contrasts with quantity of use where newspapers again showed the only significant difference. Apparently, urban dwellers read newspapers more and believe them less than do the rural counterparts. There may be an especially strong influence of weekly newspapers on rural audiences, decreasing the quantity measure and increasing the local verification potential.

TABLE 48.

OBJECTIVITY RANK--"URBAN" vs "RURAL"

	Density (cases)	Mean	SD	95% C.I.		F	p	df	t	p	Sig.
				+ or -	%						
Magazine writer	Hi (60) Lo (53)	1.433 1.623	0.927 1.023	0.239 0.282	16.7 17.4	1.22	.462	111	-1.03	.304	N.S.
Newspaper reporter	Hi (59) Lo (53)	2.288 2.604	0.789 0.884	0.205 0.244	9.0 9.4	1.26	.396	110	-2.00	.048	S.
Television news reporter	Hi (59) Lo (53)	2.881 2.623	0.853 1.060	0.222 0.293	7.7 11.2	1.55	.107	110	1.43	.156	N.S.
Radio news reporter	Hi (59) Lo (51)	3.373 3.098	0.849 0.878	0.221 0.247	6.6 8.0	1.07	.803	108	1.67	.098	N.S.

N.S. = Not Significant
S. = Significant

Reliability Rank

A variety of information sources was selected for a broad evaluation by these Teachers. Not intended to be highly definitive, the listing attempted to anticipate some of the responses to other queries. 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. Although workshops and seminars would have been preferable in the latter instance, the inherent bias of the immediate environment would have been prohibitively high and would have jeopardized the rankings of the entire list. Formal classes as a category was, in itself, a mild but real contaminant. Refinement of this list would be appropriate in further studies seeking greater precision.

The evaluation was to measure perceptions of currency, accuracy and thoroughness of coverage. Additionally, this ranking was to indicate the probability of the respondents' acquaintance with the time element of information transmission through publication. The terms up-to-date, accurate and thorough were used in the questionnaire but have been abbreviated for reporting convenience into the term "reliability."

It appears from the picture presented in Figure 26 and the data array of Table 49 that perception of timeliness did not play a prominent role in this evaluation.

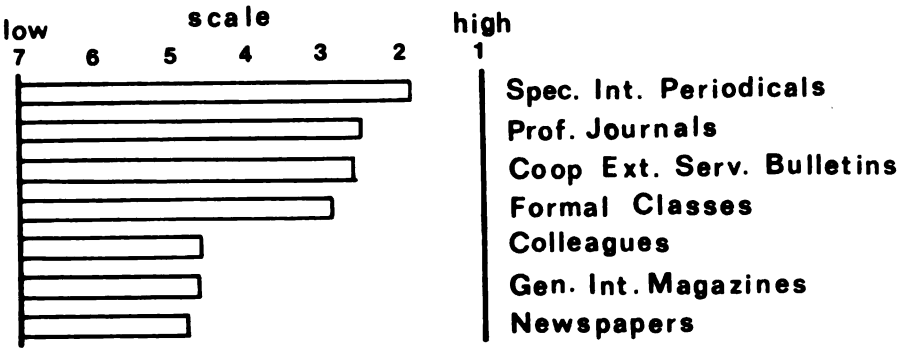


Figure 26. Reliability Rank

TABLE 49.

RELIABILITY RANK

	Rank	N	Mean	SD	95% C.I.	
					+ or -	%
Special interest periodicals	1	118	1.915	1.202	0.22	11.4
Professional journals	2	105	2.552	1.461	0.28	11.1
Cooperative Extension Service bulletins	3	75	2.640	1.248	0.29	10.9
Formal classes	4	91	2.945	1.501	0.31	10.6
Colleagues	5	69	4.681	1.622	0.39	8.3
General interest magazines	6	83	4.711	1.729	0.38	8.0
Newspapers	7	79	4.835	1.605	0.36	7.4

Publication lead time for the first-ranked special interest periodicals may range from three months to a year, using the Teachers own lists of such magazines and publishers' statements to this researcher regarding lead time.

Second-ranked professional journals could well be a year and a half between submission and distribtuion. Some of the Cooperative Extension Service bulletins used by these Teachers were nearly fifteen years old. Formal classes, especially as distinguished from workshops and seminars, may be several years behind-the-times. The interpersonal communication source, colleagues, does not appear to be held in especially high regard. The last-ranked, newspapers, is the most up-to-date source of those listed, or at least has that potential.

Thoroughness, followed or accompanied by accuracy, seems to play an essential role for these Teachers in their evaluation of a medium when the medium is transmitting environmental information.

The frequency distributions for the seven categories are displayed in Figure 27.

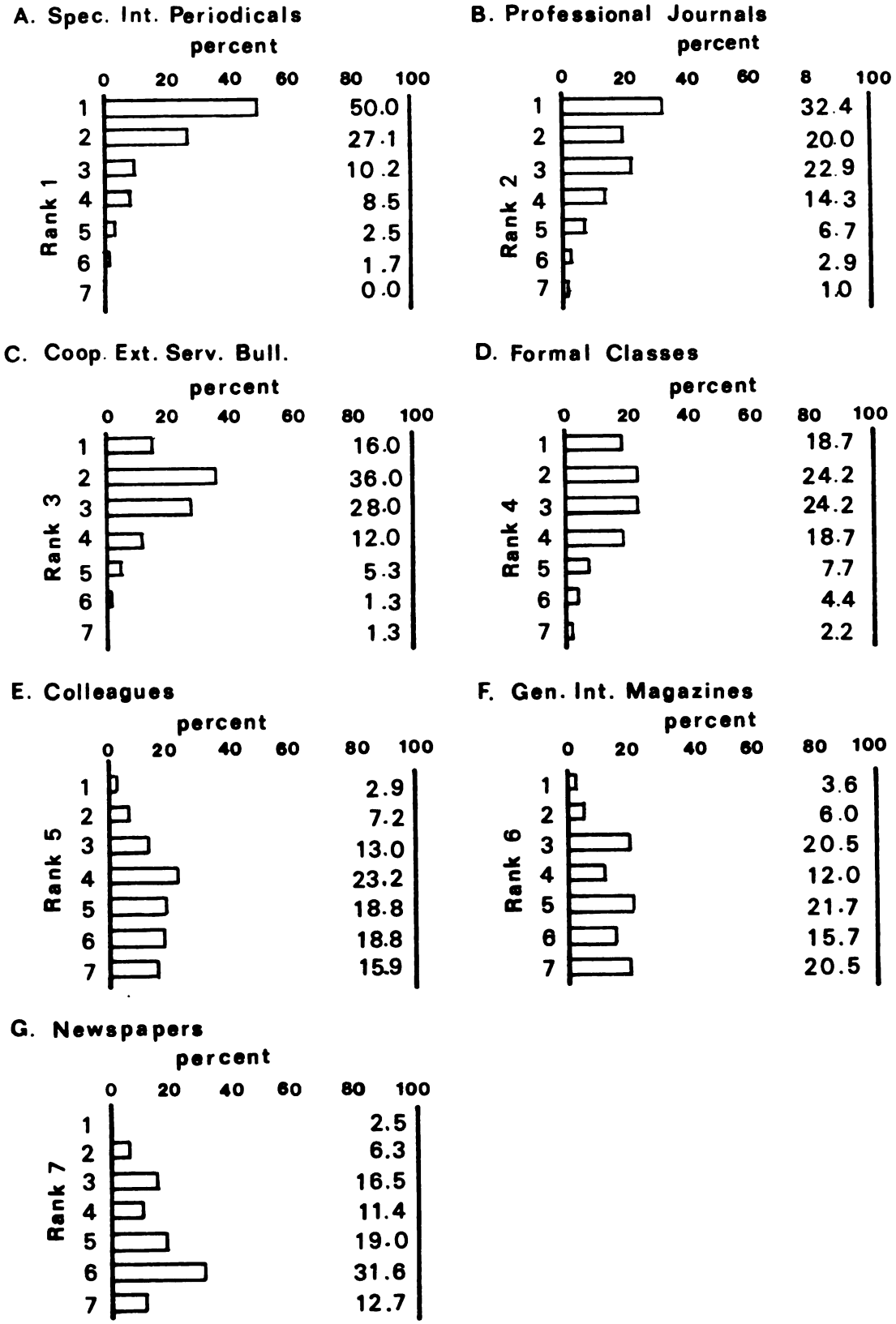


Figure 27. Reliability Rank Distribution

Source Value Rank

A condensation of the data gathered was deemed advisable in order to arrive at a simple evaluation of a variety of media, including the interpersonal representative, colleagues. The objectivity and reliability scales were chosen for this purpose. Although a further data collection for credibility of other media would seem of value, the inferred endorsement of thoroughness in the electronic media credibility rating indicates that the factor of thoroughness is particularly important in evaluation by these Teachers. For the purpose of this study, the objectivity and reliability scales are considered adequate.

Due to size strictures, error in forecasting ranking responses and the inherently narrow nature of response forcing, a system of overall information source valuation was devised using the data gathered. Although subject to question as to its numerical accuracy, it does indicate the gross rank positioning, the relative descriptive intervals, and is both inductively and intuitively consistent with all findings of this survey.

As a first step, objectivity rank was expanded to the seven-point scale. Using the established relationship between reliability and objectivity scales for newspapers and the average of all magazines (appropriately weighted by computer procedures), missing scale values were calculated. Missing reliability scale values were also computed using

this same relationship and confirmed by means of the percentage change in the objectivity scale ratings. The computation matrix is arrayed in Table 50.

The average of the objectivity and reliability scale rankings was used as the Source Value Rank numerical rating. While some may argue details of methodology, the overall rankings shown in Figure 18 B, page 165, are sufficiently distinct to draw some conclusions.

The print media which serve the special and professional interests of these Teachers are their most valued sources of information. This is not surprising nor is the low rating of radio which apparently serves more as background sound than information source. The near equality of colleagues, newspapers and general interest magazines, close to mid-scale, is enlightening in that the interpersonal interchange with colleagues was expected to rank higher than the mediated information from generalized sources. This point is further explored in the next chapter.

The premise that these ratings relate to environmental information only, or even principally, should be questioned although this context was specified to the respondents. The assumption here must be that the ratings are a blend between environmental information and general information pending instrument refinement and further study. Indeed, it is probably meaningless to attempt to survey environmental information sources distinct from general information sources.

TABLE 50.

SOURCE VALUE RANK COMPUTATION MATRIX
(for Environmental Information only)

	Objectivity Scale % Δ	Expanded Objectivity Scale diff.	Reliability Scale diff.	Rel./ Obj.	Computed Objectivity Scale Values	Computed Reliability Scale Values	Ave. Obj. and Rel. Values
Spec. Int. Periodicals			1.92		1.68		1.80
			1.14				
All Magazines	1.53	2.68	3.06 (ave.)	1.14			2.87
			0.51				
Prof. Journals			2.55		2.24		2.40
			2.16				
Gen. Int. Magazines			4.71		4.13		4.42
			0.03				
Colleagues			4.68		4.11		4.40
			0.16				
Newspapers	2.43	4.25	4.84	1.14			4.54
	114	0.58					
Television	2.76	4.83				5.52 5.51	5.17
	118	0.86					
Radio	3.25	5.69				6.49 6.50	6.09

CHAPTER X

INFORMATION CONFLICT RESOLUTION PROFILE

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, were assumed to be available on a daily or near-daily basis for "consultation."

While other interpersonal sources could have been included, 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, of course, true that the colleagues themselves could generate the conflicting information.

From Figure 7 and Table 10, page 83, it can be seen that attitude agreement between the respondents and their families or friends tends to assume a middle-ground position. It would be expected that either of these interpersonal

sources, family or friends, would generate group data of little significance when attempting to identify a generally applicable source of perceived value to the respondents for resolving conflicts in information received.

From Figure 18, page 165, it may be seen that colleagues are considered of about the same value as two of the three media sources in resolving information conflicts, with the third medium of negligible value.

Since attitudes seem to be arrived at independent of friends and family (Figure 7) and colleagues are not of especially great value in resolving information conflicts (Figure 18), it would appear that these TES Teachers are not particularly dependent on interpersonal sources for development of their attitudes about environmental matters.

With the conflict resolution question forcing a single response from the four offered (five, if no answer is included), it was assumed that there would be some relationship between the response and media use patterns. Several computer procedures were employed seeking correlations, yet none were apparent. The data arrayed in Table 51 summarizes the raw data. Excluding radio choosers from consideration, as there were only two, it can be seen that the mean values fluctuate around the mean for the population as a whole with similarly high standard deviations. This summary has as much interpretive value in itself as any of the data processing procedures used in attempts at analysis.

TABLE 51.

CONFLICT RESOLUTION PROFILE BY MEDIA USE

Selection		Magazines Min. per day		Newspapers Min. per day		Television Min. per day		Radio Min. per day	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD
Total Population	(N=123)	42.14	35.32	47.85	27.80	93.05	56.94	112.07	138.17
None selected	(N=38)	46.32	36.16	43.16	27.84	89.21	56.87	98.16	129.44
Colleagues	(N=31)	31.71	23.88	46.94	29.46	100.65	58.13	89.03	59.24
Newspapers	(N=27)	42.22	45.83	52.22	28.83	82.78	48.76	130.00	209.01
Television	(N=25)	46.60	32.43	49.80	24.77	105.60	63.12	134.60	127.05
Radio	(N=2)	67.50	31.82	67.50	31.82	30.00	0.0	210.00	127.28

Various correlations were also sought with the attitudes, actions and practices indexes with equally low-value results. The summary of these mean values is included in Table 52.

However, when the simple summary figures were assembled in an attempt to create a pictorial profile of each response category, some rationality began to appear. By converting the mean values into percentage departures from population means, the information in Figure 28 developed.

While the Figure 28 data display seems at first to be of only academic value and inferentially uncertain, it in fact summarizes with some ease and offers a basis for brief, tentative interpretation. Causal relationships may exist, but should not be inferred from the following summaries.

Television choosers tend to have higher action and practices scores, watch more television, listen to more radio, and read both newspapers and magazines more than the means for the total group. This subgroup is the most environmentally active of the five categories and has the most exposure to media.

Newspaper choosers tend to have lower action and practices scores, watch less television, listen to more radio, read newspapers more and magazines about the same as the means for the total group. This subgroup doesn't do much environmentally; it "avoids" television while maintaining its exposure to information in the other media.

TABLE 52.

CONFLICT RESOLUTION PROFILE BY
ATTITUDES, ACTIONS AND
E.E. PRACTICES

Selection		Attitude Index		Personal Action Index		E.E. Practices Index	
		Mean	SD	Mean	SD	Mean	SD
Total Population	(N=123)	75.94	10.51	27.60	24.50	13.71	13.53
None selected	(N=38)	76.87	8.70	28.71	25.14	12.43	13.12
Colleagues	(N=31)	75.39	9.21	26.56	24.25	14.17	13.66
Newspapers	(N=27)	74.48	15.16	26.31	23.87	12.38	12.16
Television	(N=25)	76.21	8.87	29.66	26.43	16.49	15.56
Radio	(N=2)	83.33	7.25	14.29	7.35	14.39	20.35

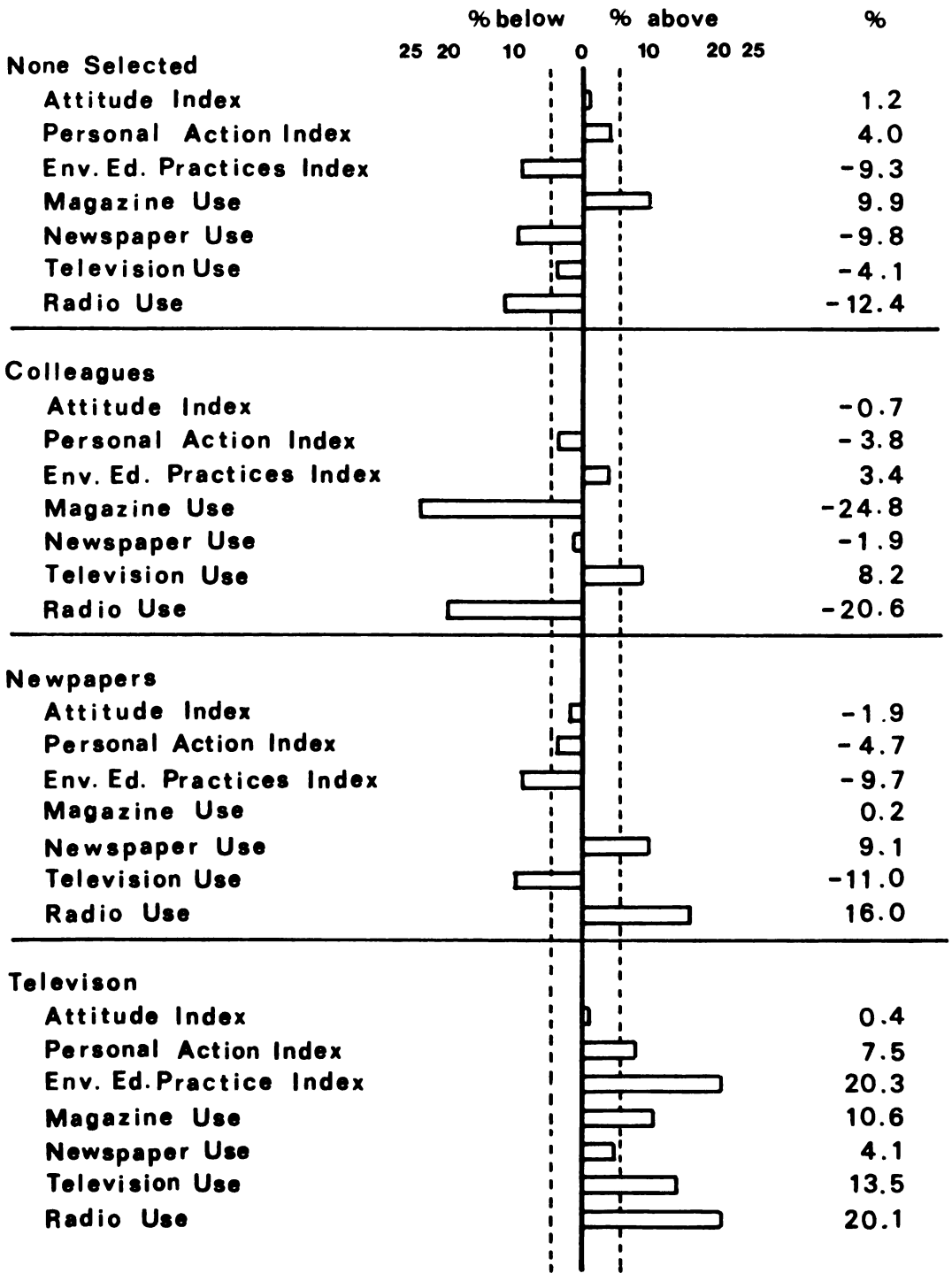


Figure 28. Information Conflict Resolution Profile -- Percent Below or Above Mean, Each Selection Category

Colleagues choosers tend to have lower action scores and higher practices scores, watch more television, listen to less radio and spend less time with newspapers and magazines than the means for the total group. It seems that colleagues choosers tend to be influenced by their colleagues toward more classroom environmental education activity, although not very strongly, and spend a lot of time with television while not making much use of the other media.

Radio choosers were only two and are therefore not included in Figure 28 nor is any interpretation offered.

No response choosers tend to have higher action scores, lower practices scores and spend less time with radio, television and newspapers but more time with magazines. While it is an oversimplification from the data available, it appears that this subgroup tends to be made up of self-contained isolates.

There are here some strong indications that those with a high-quantity and wide-ranging media consumption pattern are also inclined toward active roles. At the same time, those who consume only radio and newspapers in large amounts are not influenced to take active roles. High total media consumption rather than consumption from specific sources seems to have the most influence toward high activity levels. Perhaps those with the broader information base are also those more widely interested in the total world around them.

Hypothesis 3 states: There is no significant relationship between media use patterns and environmental attitudes, personal environmental actions or environmental education practices of the selected population. The evidence gathered in this study supports acceptance of this null hypothesis. There is little to indicate probability of a Type II error.

Hypothesis 4 states: The selected population shows no source preference in resolving conflicting environmental information received. Two aspects of the data offer tentative support for this null hypothesis: 31 percent of the respondents selected none of the options offered; three of the options received nearly equal response, the fourth receiving negligible support. A larger sample is considered necessary for firm acceptance.

CHAPTER XI

SUMMARY AND CONCLUSIONS

> Education is the key to changing human attitudes, values and feelings, as well as behaviors . . . . (Michigan Department of Education, Nov., 1973, p. 1)

> Environmental education is the basic process leading toward the development of a citizenry that is aware of and concerned about the environment and its associated problems, and that has the knowledge, skill, motivation and commitment to work toward solutions to current and projected problems. (Governor's Task Force, 1973, p. 14)

The task of systematically educating the citizenry about the environment has become one of the assignments of teachers in Michigan schools. Teachers have a continuing opportunity to affect the attitudes and behaviors of young people who will become the active citizenry of the future. Yet little has been known heretofore about the attitudes and behaviors of those very teachers who are to transmit environmental information and serve as models for developing youngsters.

This study adds to knowledge about this influential population. A total of 123 teachers attending the 1978 Teachers' Environmental School, a five-day, residential workshop program conducted by Michigan universities, was surveyed at the beginning of the workshop experience in order to measure characteristics along five dimensions.

The dimensions chosen were:

1. perception of the scope of environmental education--degree of holistic perception;
2. attitudes toward environmental affairs--intensity of positive attitudes toward the environment;
3. personal environmental actions--extent of personal involvement in environmental improvement efforts;
4. professional environmental education activities--degree of current involvement in environmental education with their pupils; and,
5. use of mass media information sources on a continuing basis--assessment of media use which contributes to development of beliefs and attitudes.

The first four dimensions are depicted in Figure 29 as an overall Environmental Attitude Profile of the teachers surveyed.

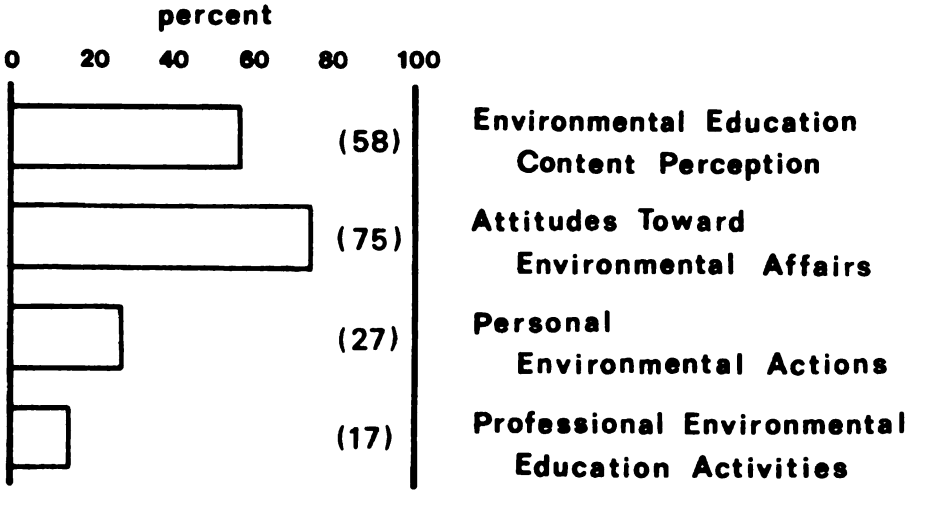


Figure 29. Summary Environmental Attitude Profile

Environmental Education Content Perception

Presented with a list of 28 curriculum topics ranging from art to zoology, the average teacher in the groups surveyed indicated that 58 percent of the topics were a part of environmental education. With 13 percent of the teachers choosing to include all topics within the scope of environmental education, the remaining teachers averaged only 43 percent. Neither percentage represents a strong degree of holism.

Despite the admonition of the Michigan state department of education 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),

these teachers do not support the official stance when surveyed. They may, of course, not have heard or read the state's position. Teachers better informed about the official state position or about environmental education may see a greater degree of holism in environmental education than the average of this population.

The topic list offered was a condensation of the total range of subject titles included by state, national and international organizations in a holistic concept of environmental education. Additional workshop exposure might have influenced the responses to the question or the perceptions of the scope. However, changed response patterns at the conclusion of the Teachers' Environmental School

experience would not necessarily reflect retained changes in perceptions or indicate likely changes in teaching methods regarding environmental affairs.

Attitudes Toward Environmental Affairs

Consensus is that a favorable attitude is necessary to meeting the environmental education goal, as stated by Pettus (1976, p. 48), of bringing about "informed environmental policies for society which will be compatible with the maintenance of a suitable planetary environment." A distinct advantage of this kind of elusive goal statement is that people may advocate such policies and support them in conversation, and also the polling-booth, without having to overtly engage in whole-heartedly supportive behaviors on an individual basis.

Teachers in this study showed a strongly favorable attitude toward environmental affairs (80%) when questioned about both issues and actions attitudes. When no action attitude was required, the attitude favorability toward the environment increased further (82%) with identification of specifically stated issues. Attitudes jumped even higher on the scale (92%) when no action attitudes were required and issues were not defined. These findings are in accord with expectations suggested by Weinstein's studies (1972) and reflect the "situational variability" of Schuman (1972) which dictates compromise positions when both issue values and action values are combined in a single attitude

statement.

Attitudes may be expected to change over time, even in a population selected for its favorable disposition toward a subject. There is indication, however, that teachers entering the Teachers' Environmental School change little. Despite the heterogeneity in other dimensions, there appears to be relative homogeneity in average attitude of attending teachers upon arrival.

When 1978 teachers were compared with a similar group of 1965, a statistically significant difference was found; the 1978 teachers scored 2.46 points lower on the attitude measuring instrument than the 1965 teachers, a difference of 1.9 percent. This may be more a reflection of a word change than a real attitude change.

The attitude measuring instrument was modified by replacing the word "conservation" with "environment," sometimes necessitating minor rephrasing of the statement. This was done to bring the statement to a more current language use, considered especially important as conservation has lost its general connotation and is more specific in its meaning than it was in 1965. During both time periods, conservation was generally considered a "good thing" with positive values. Environment, on the other hand, has tended to create conflicts and ambivalence, even in its ardent proponents. The score change may represent a greater degree of compromise or more ambivalence in the respondents' attitudes rather than a lessened favorability.

Both 1965 groups should be compared with the 1978 group for the additional perspective offered. The 1965 group without workshop experience was selected by workshop "attendees." It is reasonable to assume that those people would be likely candidates for workshop attendance and that their attitudes would tend toward consistency with those doing the selecting. The no-workshop 1965 group was only four percent behind the 1965 workshop group in attitude strength and 2.2 percent behind the 1978 group.

Whatever the influences, a change of less than two percent between 1965 and 1978 is modest by any standard and indicates potential in this dimension for homogeneity among teacher groups when entering the Teachers' Environmental School.

Attitude Congruence with Significant Others

Whereas there appears to be some attitude consistency among teacher groups attending the TES and likely to attend, there is support here for Foerstel's findings (1976) that there is little probability of congruence with other groups.

Foerstel found little problem-ranking consistency when comparing groups of students, teachers, parents and environmentalists although there was consistency within each group. Positing that there might be some congruence between groups if the attitudinal stance was more general than specific, this study offered a generalized comparison

of perceived differences. Although a more specific inquiry comparing real groups would be of value in future studies of this point, a factor was sought here which might explain to some extent behaviors not in accord with attitudes.

This comparison was in keeping with the Fields and Schuman study (1976-77) on attitude-behavior consistency testing the assumption that attitudes (expressed in surveys) are often not expressed in behaviors because individuals believe "significant others will be displeased." O'Gorman and Garry (1976-77) also support this conservative bias, the tendency to behave more conservatively than measured attitudes would suggest. Although O'Gorman and Garry refer to pluralistic ignorance, it would be more descriptive to call this attitude-behavior inconsistency "pluralistic avoidance."

Although the teachers responded with a 92 percent strength, they saw their friends and families in agreement at only a 52-68 percent level, the latter value representing family members only. This not only points to a conservative bias in views of attitudes of others and thus in actual behaviors, but to two other factors as well. These teachers, with strong attitudes favoring environmental matters, do not appear to be especially influential within their families nor within their circle of friends and apparently do not choose their friends with environmental views as important bases for selection. With such modest influence upon their friends

and families, can these teachers be expected to have a strong influence on their students?

Personal Environmental Actions

The statements comprising the attitude measure used in this study are value-laden and often combine cognitive, affective and behavioral elements. Such a composite measure is usually an unreliable predictor of overt behavior. To determine if this population, self-selected for interest in environmental matters, in fact expressed their declared attitudes through environmentally supportive behaviors, self-reported action histories were acquired.

Four categories of personal involvement in environmental improvement efforts were included to reflect public and private actions in verbal and physical forms with and without direct social-system influence.

Despite their strongly favorable environmental attitudes, these teachers do not appear to be particularly interested in taking personal action to affect the course of environmental events.

Of the entire group, 30 percent indicated they had not participated in any public, environmental-improvement projects. An additional 23 percent said they had participated only in cleanup campaigns, an activity usually receiving high public approval.

Thirty-seven percent did not regularly recycle paper,

bottles or cans, a more private action, not necessarily requiring public approval.

Publicly verbal defense of their views about environmental matters was even less popular. Forty-eight percent indicated they had not espoused their attitudes about environmental affairs publicly.

Two-thirds of these teachers had not attempted to influence public or corporate bodies on environmental events.

Acknowledging that opportunity and recognition of opportunity may play important roles, these teachers do not seem to be inclined to take personal environmental action. There is indication that if there is opportunity (and recognition of that opportunity), public recognition and social approval, these teachers are apt to be participants.

There must be, however, the further acknowledgement that these teachers have not necessarily been initiators of personal environmental action, certainly not the average teacher in the group surveyed. This does not bode well for their influence as models for students in their classrooms.

Professional Environmental Education Activities

Nearly three-fourths of the teachers attending the 1978 Teachers' Environmental School conducted some form of environmental education in their school program. The content was not determined, but the self-reported time allotment averaged about 12 minutes per day, three to four percent of teacher-student contact time. If environmental education is

total and comprehensive and part of all subject areas, as the state Department of Education claims, these teachers are apparently not aware of it.

Perhaps this is due to a perceived low level of competency and consequent avoidance which might be remedied by TES attendance. Yet only 37 percent had made recent attempts to remedy low competency by environmental education workshop attendance. Even in this group, the majority of "workshoppers" (60%) spent less time on environmental education than the average teacher surveyed.

The obvious conclusion here is that environmental education participation in classroom programs is more token than comprehensive with a decided lack of enthusiasm, at least prior to TES attendance.

Outdoor learning experiences were popular with 75 percent of the teachers being involved. School sites and natural areas, perhaps the same within the individual's perception, were preferred. This is a logical expectation from the common tendency for environmental education to be identified with science or biology and the popularity of the "outdoor classroom" among elementary school teachers of science.

Perhaps more promising for the total environment was the 57 percent involvement of teachers with their students in out-of-school environmental education and environmental problem-solving activity.

It appears that activity out of the classroom is more

likely to be perceived as environmental education or is the preferred form. The 1976 Cummings study, supported by Bozardt's observations in 1975 and 1976, suggests that thoroughly prepared, pre-packaged materials would help increase environmental education in the classroom. It seems that teachers cannot be relied upon to conduct the comprehensive environmental education recommended by the state without a great amount of direct assistance.

Use of Mass Media Information Sources

There is considerable discrepancy in the views of environmental communication authorities 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. While this study does not resolve discrepancies, it does offer some additional clues for future research.

Most of the teachers surveyed used all four of the media offered: radio, television, newspapers and magazines. The mixtures of practices and attitudes offer some insight into the information acquisition patterns of teachers.

Although these teachers were fairly heavy consumers of electronic media, news broadcasts were not considered an especially important part of broadcast programming. Perhaps this was due, in part, to a low comparative-credibility

rating of electronic media reporters. Television's special and documentary programs on environmental matters were, however, highly regarded. Extensive and dramatic coverage appear to have strong influence on quality perceptions.

Magazines showed a higher use-percent than the other media and reading patterns provided especially convenient subject matter breakdowns. As might have been expected for this group, those magazines directed toward natural history and generalized environmental interests were over 50 percent more popular than any other single category. But, this category received the lowest intensity of use. It may be concluded that these magazines are perused rather superficially, perhaps for their visual imagery rather than their verbal content, and have little but esthetic impact on attitude formation.

Also, when intensity of use is determined, professional journals directed toward teachers and intended to assist them in improving their performance ranked next to last, only slightly ahead of the "environmental interest" publications.

In evaluating media, magazine writers were perceived as being the most objective and special interest periodicals were seen as especially up-to-date, accurate and thorough in their coverage of environmental affairs.

For these teachers, "thoroughness" appears to be the essential element in evaluation of media transmitting environmental information. Other considerations seem to carry

little weight.

The mass media information sources achieving the highest value ranking in this survey were magazines and journals. The data indicate that these TES Teachers are rather dedicated readers, especially of the general interest magazines and those catering to special interests. The notable exception is the apparently superficial consumption of periodicals specializing in natural history or environmental subjects. Although no category of publication should be considered unimportant, environmental communicators would do well to note the strong influence of general interest periodicals, especially those emphasizing news and news-type feature coverage.

If there is any correlation between mass media consumption patterns and environmentally favorable activity, this survey suggests that it lies in total rather than specific consumption. Of the teachers surveyed, those with high-quantity and wide-ranging media usage were more active, personally and professionally, than those employing smaller quantities or a narrower range. An inference which might be drawn is that those with a broad information base are more widely interested in the total world around them.

The data accumulated here leads one to conclude that these teachers use mass media to gain a general perspective on the course of society, to reinforce their personal

interests and for entertainment, but do not use mass media directly to support their professional growth or add to environmental knowledge.

Information Conflict Resolution

When asked to indicate their preferred source for resolving conflicts in information received about environmental matters, the 1978 TES Teachers indicated no special preference. With colleagues, newspapers, radio and television offered as immediately available sources, the interpersonal source, colleagues, ranked little higher than the mediated sources, newspapers and television, with radio far behind. Indeed, more than 30 percent declined to choose from the four selections.

These teachers apparently rely heavily on knowledge already acquired, or less immediate and ubiquitous sources, when confronted with conflicting environmental information. It seems unlikely that they would simply allow the dissonances to persist. Perhaps the information is ignored or judged irrelevant to themselves.

Perhaps the continuing flux in environmental information is sufficiently confusing that only the information which reinforces existing attitudes and beliefs, or serves a self-centered special interest, is selected for acquisition.

Environmental Attitude Profile Summary

A profile of the entry attitudes of teachers attending the 1978 Teachers' Environmental School may be briefly summarized. This attitude profile would not be of value without including personal and professional behaviors which are overt expressions of declared attitudes. Figure 30 offers a pictorial description of attitudes and the behavioral support for them.

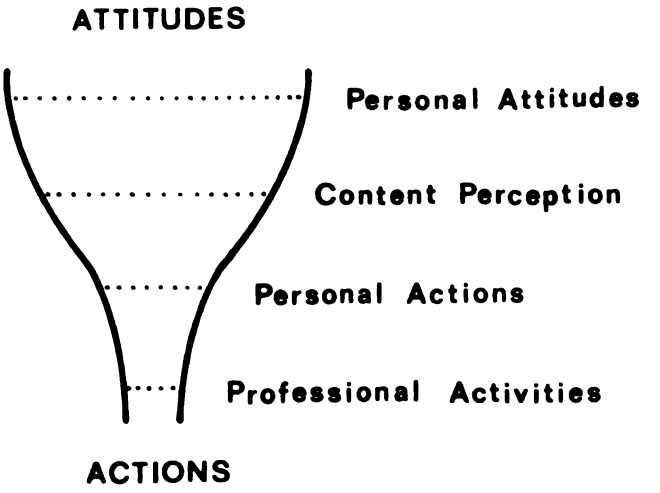


Figure 30. Summary Profile: Attitudes, Actions, and Environmental Education Practices

These teachers express a serious concern for the quality of the environment and show attitudes strongly favorable to the environment. But, they do not support these views in personal actions favoring environmental improvement. Nor have they had strong influence on the attitudes of friends or family members.

The environmental education conducted by these teachers was minimal and their perception of the scope of environmental education was limited, certainly far from holistic or comprehensive. It would not be expected that these teachers would have much positive effect on the environmental attitudes of their students.

Although their consumption of mass media was high, any information which would assist their professional growth or expansion of their environmental knowledge must have come from other sources. One must wonder if these teachers acquire any information on a continuing basis to keep up with changes in their profession or to keep their knowledge levels of subject matter current.

Perhaps attendance at the Teachers' Environmental School is an effort to develop professionally and improve their abilities and performance in environmental education.

Implications for Future Research

This study has constructed a profile of an influential population: teachers who have actively expressed interest in transmitting environmental information to developing youngsters under the banner of environmental education. While in many ways the group studied seems to represent the larger population of which it is a part, in many more ways it only suggests a rude tendency. Both common sense and statistical procedures recommend enlarging the sample size before drawing more than tentative conclusions about most of

the characteristics. Too, studies over time, samples drawn year after year, might reveal some of the impacts of changing events.

Further, the consequences of attendance at the Teachers' Environmental School should be developed. In the words of Jane Renaud, TES faculty member from Wayne State University,

> 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?

Does the TES "treatment" effect changes in attitudes, perceptions, practices and actions? Any instructional program should, from time to time, be evaluated as to its effectiveness. There is now an approximate picture of these teachers upon entry into the program. A similar profile after departure would help evaluate the receptivity of the attending teachers to the concepts and approaches of environmental education. Such a study would aid in modification and development of training programs to enhance teacher effectiveness.

There are less sweeping points of information which should be explored further.

This study affirmed the assumption that the levelling effects of education and profession at least suppressed urban-rural differences based upon current residence. It would be well to determine if place of youthful residence affected attitudes and actions with differences perhaps surviving.

The attitude measuring instrument was updated in its language by substituting environment for conservation. Evidence collected here leads to the conclusion that the change did not severely affect the instrument. Another application of the modified instrument to a similar population would be appropriate before endorsing the revised instrument's reliability.

Some additional exploration of teacher perception of the scope of environmental education and changes in perception which might have taken place as a result of TES experiences would offer some guidance to formulators of environmental education training programs.

Change studies would also contribute to a determination of the acceptability of environmental education as a central or as an ancillary instructional track.

Considerable evidence is emerging to indicate that teachers would make use of pre-packaged environmental education materials if they were available. There is also indication that even enthusiastic teachers need and want direct assistance, even specific direction, in conducting environmental education programs. It would be useful to investigate these approaches thoroughly to determine acceptability of such materials and specific assistance.

Much more work needs to be done in the study of environmental communication with a variety of audiences. A body of knowledge is gradually developing in this specific field but it needs both expansion and synthesis. While some

environmental concepts and specific issues may be treated as consumer products to be sold, the whole of environmental education, formal and informal, affects personal, societal and cultural value systems and is affected by them. Teachers and their student audiences seem to accept, with filtering, environmental education when it is based on biophysical systems, but they have not yet accepted it when it impinges on social, economic or political systems, or when it is truly comprehensive. This study adds some details regarding a teacher audience, but further research needs to be narrowly focused, studying teachers, students and parents as interactive systems. The flow of environmental information through educational and media systems, to and from the citizenry, needs concentrated attention.

APPENDICES

APPENDIX A

ENVIRONMENTAL ATTITUDE PROFILE QUESTIONNAIRE

APPENDIX A

ENVIRONMENTAL ATTITUDE PROFILE

Questionnaire Number 0200

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

For items 2 through 13, please indicate with a check mark whether YOU consider the topic NOT a problem, a SLIGHT problem, a MODERATE problem, or a SERIOUS problem.

	NOT a problem	SLIGHT problem	MODERATE problem	SERIOUS problem
2. Air pollution	___	___	___	___
3. Water pollution	___	___	___	___
4. Water and sewage treatment facilities	___	___	___	___
5. Trash and garbage collection and disposal	___	___	___	___
6. Land use conflicts	___	___	___	___
7. Citizen participation in community decisions	___	___	___	___
8. People willing to work for good of the community	___	___	___	___
9. Community planning	___	___	___	___
10. Community spirit and pride	___	___	___	___
11. Energy cost	___	___	___	___
12. Energy supply	___	___	___	___
13. Unnecessary energy use	___	___	___	___

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 14. Progress in our country will be slowed if we use effective environmental protection measures.

SA A U D SD 15. Conservation seems foolish when our standard of living is constantly rising.

SA A U D SD 16. Science will be able to find a substitute for natural resources when the original supply is exhausted.

SA A U D SD 17. The public schools of our nation do not spend enough time in environmental education.

SA A U D SD 18. 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 19. Environmental education should be a very important area in the teaching of biology.

SA A U D SD 20. I consider environmental education to be a minor area in the education of the average citizen for everyday living.

SA A U D SD 21. Effective environmental protection practices endanger the personal liberty of a person.

SA A U D SD 22. Private business interests are responsible for many poor environmental practices.

SA A U D SD 23. The waste of our resources is an illustration of extreme selfishness and lack of consideration.

SA A U D SD 24. The subject of environmental education just doesn't interest me.

SA A U D SD 25. Environmentalists are too cautious and stand in the way of progress.

SA A U D SD 26. Environmentalists in general are alarmists.

SA A U D SD 27. Environmental education is important but you can't change human nature.

SA A U D SD 28. Poor environmental practices can weaken our position as a world power.

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

SA A U D SD 29. Conservation of our forests is not necessary as we already have substitutes for wood.

SA A U D SD 30. 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 31. There is little I can do regarding the environment; I am only one person.

SA A U D SD 32. Some businesses are against environmental protection measures because they feel the measures will restrict their activities.

SA A U D SD 33. When natural resources are used up in one area we can always move on to other areas.

SA A U D SD 34. 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 35. 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 36. If a person is not interested in environmental issues, he should not have to spend time learning about them.

SA A U D SD 37. Since our forefathers did not practice environmental protection, I see no reason why we should.

SA A U D SD 38. The great enemy of the environment is indifference on the part of the people.

SA A U D SD 39. 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 40. To practice environmental protection within the home is too time consuming.

SA A U D SD 41. The study of environmental education in the field is generally more effective than studying it in the classroom.

SA A U D SD 42. Prevention of waste within the home falls in the area of environmental protection.

SA A U D SD 43. Willful waste is a crime against humanity.

SA A U D SD 44. Human nature is such that we can never educate people to save for tomorrow.

SA A U D SD 45. We are an extremely wasteful nation.

4

In several of the following items you are asked for time estimates. In each instance, please try to estimate as closely as you can the average through several months.

46. Please list the periodicals, journals and magazines you read regularly.

_____ ___

_____ ___

_____ ___

_____ ___

_____ ___

_____ ___

_____ ___

_____ ___

47. In the space after each name above, please indicate about how many hours per month you spend with each publication.

48. How many times a day do you:

___watch TV news

___listen to radio news

49. Please list the newspapers which you read regularly.

Name of Newspaper	and/or	City of Publication
_____		_____
_____		_____
_____		_____
_____		_____
_____		_____

50. Which do YOU think does the best job of objective 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

5

51. 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 Documenteries		
Public Television		
National Radio News		
Local Radio News		
Radio Specials		

52. About how many hours a day do you spend:

watching television ____hours OR ____minutes
listening to radio ____hours OR ____minutes
reading newspapers ____hours OR ____minutes
reading magazines ____hours OR ____minutes

53. Are you acquainted with the Cooperative Extension Service?

___yes ___no

If yes, Do you make use of the publications of the Cooperative Extension Service?

___yes ___no

If yes: Do you use these publications in your classroom? ___yes ___no

Do you use these publications to prepare for classroom activity? ___yes ___no

Do you use these publications for your own needs? ___yes ___no

How would you rate the credibility of the Cooperative Extension Service?

Not Credible Very Credible

54. 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, Woman's Day)

___professional journals

___newspapers

___formal education classes

___colleagues

___Cooperative Extension Service bulletins

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

55. 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 64, next page.

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

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

_____

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

59. If you answered yes to question 58, on what kinds of sites do you conduct these experiences? (Mark all that apply.)

___urban ___rural ___parks ___school sites ___natural areas

60. 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? _____

61. 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

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

_____minutes per day OR _____minutes per week

63. 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

7

64. Are you a member of the MEA? ___yes ___no

65. What influenced you the most to attend the Teachers' Environmental School?

___discussion with colleagues
___newsletter notes
___administrative encouragement
___scholarship availability
___mailed notices
___meeting academic requirements
___other _____

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

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

68. To how many civic groups do you belong?

___0 ___1 ___2 ___3 ___more than 3

69. To how many professional organizations do you belong?

___0 ___1 ___2 ___3 ___more than 3

70. Do you regularly recycle any of the following materials? Check if 'yes'.

___paper ___bottles ___cans or metal goods

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

___clean-up campaign
___beautification project
___environmental protection project

72. 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

73. 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

74. 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

75. Do your friends share your view?

___yes ___some of them ___no

76. Do family members share your view?

___yes ___some of them ___no

77. Have you ever defended your position publicly?

___yes ___no

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

___yes ___no If yes, about how many?_____

79. What is your age group?

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

80. ___male ___female

81. Married: ___yes ___no

82. Are there children in your household? ___yes ___no

83. To what ethnic group do you belong?

___American Indian ___Latin American ___Other
___Black ___White

84. What educational level have you completed?

___High School ___Bachelor's ___Ph.D.
___Associate Degree ___Master's

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

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

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

___city ___suburb ___small town ___country

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

___city ___suburb ___small town ___country

88. What is your vocation?_____

Thank you for your participation.

APPENDIX B

CODEBOOK
Environmental Attitude Profile - 1978

APPENDIX B

CODEBOOK
Environmental Attitude Profile - 1978

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

APPENDIX C

A Review of the 1965 George Study as it is Relevant to the Current Thesis

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A Review of the 1965 George Study as it is Relevant to the Current Thesis

"A Comparative Analysis of Conservation Attitudes in Situations Where Conservation Education Is a Part of the Educational Experience"

Robert W. George modified and administered a conservation attitude survey in 1965 which was reported in his Ph.D. dissertation of 1966. His research served as the foundation for this 1978 attitude survey.

In his research, George reviewed the prior work upon which his study was based.* Quaintance, in 1940, pointed out, in George's words, "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 studied 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."

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* References cited by George are listed in this appendix and do not appear in the thesis List of References.

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 now 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 significant in 1978 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 prompted the wording changes from 'conservation' in the George study to 'environment' in the current thesis 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 confirmed the validity and reliability of his measuring instrument using statistical procedures.

The 1965 investigation 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 analysing 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."

All three, Laug, Whiteman and George, acknowledged the work of Wievel as basic to their further development of

attitude measurement and analysis. George pointed out (p. 33) some of the problems inherent in combining attitude and knowledge questions in the same measuring device. He went on to thoroughly explore the previous test instruments, revising the testing tool to make it "adaptable to a wider range of ages and educational backgrounds" (p. 34). George was fortunate to be 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 was 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. Intensification resulted in a tendency to cluster scores in the upper portion of the range. Although intensification may in some instances make it easier for the respondent to answer as he thinks he should, it probably avoids or reduces more problems than it causes when it is performed with the care and thoroughness which George applied.

The clustering caused by intensifying the statements

does make it more difficult to evaluate the scores of both individuals and groups. Changes in attitude scores may appear as small values when in fact the changes are fairly important. These small-value changes may then require rather large populations, sample or total, for statistical procedures to determine that a change is statistically significant. Differences within groups may also appear as disproportionately large when evaluating between-group differences. Reliance on statistical evaluation should be strongly tempered by intuitive as well as deductive interpretation of the data collected. Further work with this instrument will help to determine the reliability of small-value changes, especially if a solid data base may be used as a base-line reference.

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. The adults experienced a summer conservation workshop for teachers and leaders, the then-current equivalent of today's Teachers' Environmental School.

As a result, George's preliminary study determined

(pp. 48-9) 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. His statement that "the consistent correlation between experience and total scores as well as part scores reflected the validity of the measuring device" (p. 113) is particularly relevant to the current thesis. George's work analyzed a variety of influencing factors among all groups concluding, in so doing, that the attitude measuring instrument was both a valid and a reliable device suitable for high school, college and adult groups.

The provision should be made that only high-interest groups have so far been studied and should therefore be the only groups for whom this measuring instrument may be considered sound at this time.

This researcher agrees that, from the evidence presented by George, his attitude measuring instrument is both valid and reliable for high school through adult groups having expressed interest in conservation and environmental matters.

APPENDIX D

GEORGE DATA COMPARISON

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GEORGE DATA COMPARISON

In order to test for significance in the mean differences between the 1978 group data and the 1965 group data, Student's t was the statistic chosen. As the published George data was properly concerned with the overall test instrument rather than its parts, variances for the several sections were not included. Therefore, a reasonable procedure for comparison was devised and t-test calculations were then performed.

The George data scores for Part A and Part B were assumed to add directly as is the apparent case with the 1978 data. They were also assumed to have standard deviations directly proportional to that for the complete instrument. Thus:

$$\frac{\text{mean A score + mean B score}}{\text{mean Total score}} = \frac{\text{A + B std. dev.}}{\text{Total std. dev.}}$$

Comparing the results with similar treatment of the 1978 data indicated that this was not unreasonable and would be apt to produce values nearly equal to or somewhat less than the real values.

In order to accommodate the possibility that 1965 variances might in fact approach those of 1978, a second set

of computations was performed assuming variance equality. For the two groups of teachers, this treatment should then provide a reasonable range for probability comparison.

As the 1965 DNR group produced a variance close to that of 1978, and both sets of calculations resulted in quite large t values, it is reasonable to assume at least fair validity of the method for indicator purposes.

The following formulas were used in the calculations of t values, computer processed.

pooled variance $$s^2 = \frac{(n_{78}-1)s_{78}^2 + (n_{65}-1)s_{65}^2}{(n_{78}-1) + (n_{65}-1)}$$

sample mean diff. $$s_{\bar{d}}^2 = (s^2/n_{78} + s^2/n_{65})$$

t value $$t_{\bar{d}} = \frac{(\bar{X}_{78} - \bar{X}_{65})}{s_{\bar{d}}}$$

Significances were determined by reference to the tables found in Biometrika Tables for Statisticians, E.S. Pearson and H.O. Hartley, eds., Vol. 1, 1956.

APPENDIX E

PERCEIVED CONTENT TITLE SOURCES

APPENDIX E

PERCEIVED CONTENT TITLE 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, Mich.

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

Ovid-Elsie School District, Elsie, Mich.

Oakland Community College, Bloomfield Hills, Mich.

Mid-Michigan Community College, Gladwin, Mich.

University of Michigan, Ann Arbor, Mich.

Michigan State University, East Lansing, Mich.

APPENDIX F

PERIODICAL CATEGORIZATION SYSTEM

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PERIODICAL CATEGORIZATION SYSTEM

Upon completion of the first two entry-profile surveys, a summary of the "periodicals, journals and magazines you read regularly" was compiled to indicate the scope of titles which might be encountered in the survey. This summary was also to provide guidance in selection of a useful system for categorization and data-analysis coding.

The 56 respondents included in this preliminary data scan listed 113 different titles. From this list, eight categories were chosen to represent the range of periodical-reading interests of the respondents. For the purposes of the analyses anticipated, the groupings chosen were considered to have the greatest potential utility, permitting meaningful variations of data-collapse techniques, yet remaining sufficiently distinct and subdivided to allow useful correlations -- without being cumbersome. The titles included in each category by all respondents are listed in Appendix G.

Professional Journals was selected as a major division with two subdivisions. Professional journal was defined as a periodical addressed in its content and its included

advertising to those who are practicing professionals in a particular specialty, discipline or subject field. Although individuals who are not practicing professionals might be subscribers and regular readers, the scope and depth of content would have the greatest appeal to those who are paid for their interest in the topics presented.

Two subdivisions were drawn to satisfy the specialized needs anticipated for this study. One was based on the content having emphasis on the biophysical sciences; the other included those publications with content emphasizing applications technology and methodology. The placement of a particular periodical in one or the other of these subdivisions tended, in some instances, to be subjective and one might be hard pressed to defend a choice for an occasional title. The first criterion was the content, the second was the apparent advertising audience. These two were usually quite clear. A third criterion was employed if there was still question as to placement: a subjective appraisal of the probable interest of the reader -- increased knowledge of the biophysical environment itself or increased knowledge of methods or techniques for utilization of biophysical resources by the human culture. In the end, this latter distinction is an important indication of the orientation of the audience and was considered a potential correlation item.

Four subdivisions of "Special Interest Magazines" were selected. The first included those periodicals with primary

emphasis on the environment in general or the broad field of natural history. Some of these titles might well be considered in the same utility class as professional journals and indeed are often so used. However, a distinction was made based upon style of presentation. A periodical written for consumption by a general audience and requiring little or no specialized academic training for understanding of its content was classified as Special Interest rather than Professional. Those with an apparent point-of-view toward the topics presented rather than emphasizing the more detached and dispassionate recitations of findings usually considered more characteristic of "professional" journals were placed in the Special Interest category.

The second subdivision followed the same considerations as with professional journals: those magazines with primary emphasis on science and technology, again drawing distinctions between "professional" and "special interest" based on "scientific" versus "popular" styles of presentation. An important question arose at this point as to the proper classification of magazines aimed at farmers. Several of these might well be categorized as professional journals emphasizing resource utilization. As a consequence of this question, a further refinement of categorization was adopted. The vocation of the respondent was used to determine whether a title was professional or special interest. Thus, if the respondent was a farmer by vocation, a farm magazine would be listed as a professional journal. If the respondent was

a teacher by vocation, a farm magazine would be listed as a special interest periodical emphasizing technology. This same delineation was then applied to all periodicals and all respondents.

The third subdivision of Special Interest magazines included those titles emphasizing outdoor activities and sports. Some of these might be considered resource utilization and thus appropriate for the Methods or Science and Technology divisions. However, when in question, the distinctions were based on vocation versus hobby utility. Hunting and fishing magazines would then be considered Special Interest with Outdoor Activity Emphasis unless the respondent was a professional hunter or fisherman and, because such activities are today essentially hobbies rather than potential or ancillary employment, Technology Emphasis appeared to be somewhat less appropriate than Outdoor Activity.

The fourth Special Interest category included all others where readership would reflect a special subject interest rather than the more generalized interests encompassed by the next two categories. Again, some titles might appear to be appropriate to the methods or science and technology classes and in these cases placement in the Other category was based on a subjective judgment related to the breadth and depth of content presentation and the nature of the advertising in the magazine.

The last two subdivisions distinguish two types of

General Interest magazines: News Emphasis and Features Emphasis. To be classified as a news magazine, a periodical must be distributed at least weekly. It must also cover a wide range of topics and appeal to a variety of interests.

General Interest Magazines with Features Emphasis may have a recognizable focus, but cover a broad range of interests and treat topics with some depth. Although specific articles or even issues may be timely in nature, the distinction between news magazines and features magazines is readily made for this study on the basis of frequency and lead-time of publication.

APPENDIX G

PERIODICAL TITLES ASSIGNED TO CATEGORIES

APPENDIX G

PERIODICAL TITLES ASSIGNED TO CATEGORIES

Professional Journals with Biophysical Emphasis

Transactions of American Fisheries Society
Journal of Fisheries Research Board of Canada
Science
American Scientist
Revue de ecologie et biologie du sol
Transactions of American Microscopical Society
Journal of Sedimentary Petrology
Amer. Assoc. of Petroleum Geologists Bulletin
Environmental Education Report
American Forestry Journal
Naturalist
Design and the Environment

Professional Journals with Methods or Technological Emphasis

American Dental Assistants Journal
AVA Journal
MEEA Newsletter
MEA (Journal)/(News)
NEA Journal
Teacher
Learning
Instructor
Oil and Gas News
Journal of Forestry
Science Teacher
Science and Children
Biology Teacher (American Biology Teacher)
Museum News
World Oil
Journal of Oil and Gas
Doane Report
School Library Journal
Education Journal
Nat'l Council of Teachers of English - Elem. Journal
Journal of Chemical Education
(cont'd)

Prof. Journ. Meth. & Tech. (cont'd)

National Biology Teacher
Michigan Science Teacher's Review
Metropolitan Detroit Science Teacher's Review
Today's Education
Teacher's Voice
Early Years
Exceptional Child
Amer. Psych. Assoc. Monitor
Diagnostique
Teacher Education
Resource Recovery
Mining Engineering
Assoc. of Engineering Geologists Journal
Canadian Mining
Skillings Mining Review
American Congress of Surveying and Mapping
American Journal of Nursing
Michigan School Board Journal
Michigan Elementary Principals Magazine
ASPO Planning
American Institute of Planners Journal
Park and Recreation Magazine
Mathematics Teacher
Arithmetic Teacher
Research in Mathematics
Archaeology
Horticulture
American Nurseryman
Read
Earth Science
Chemistry
Landscape Architecture Quarterly
Progressive Architecture
NEA Reporter
Steelmeaders Newsletter
School Shop
Forest Science
Journal of Agricultural Economics
Forestry Chronicles
American Logger
Grade Teacher
Reading Teacher
Today's Child Journal
Extension Journal
Forest Magazine

Special Interest Magazines with Generalized Natural History or Environmental Emphasis

National Geographic
Michigan Natural Resources Magazine
National and International Wildlife
National Geographic World
Women's Nat'l Farm and Garden Newsletter
Audubon
Michigan Botanist
Field Museum of Natural History
Smithsonian
Rhodora
Ranger Rick
Environmental Defense Fund
Cousteau Society
Not Man Apart (Friends of the Earth)
Explorer
Natural History
Forest -- American
Mother Earth News
Ecology newspaper, Grand Valley State College
The Living Wilderness
Sierra Club Magazine
Environment
Environmental News
Astronomy

Special Interest Magazines with Science and Technology Emphasis

Popular Science
Popular Mechanics
Mechanix Illustrated
Scientific American
Science Digest
Journal of American Orchid Society
Horticulture
Science News
Farm Journal
Michigan Farmer
Michigan Farm Bureau newspaper
Hoard's Dairyman
Successful Farming
Science Illustrated

Special Interest Magazines with Outdoor Activities and Sports Emphasis

Michigan Out-Of-Doors
Sports Afield
Field and Stream
Runners World
Sports Illustrated
Cruising Magazine
Sail
American Rifleman
Outdoor Life
American Hunter
Wilderness Camping
Outside
Northwoods Call
Mariah
Eddies, Pools and Riffles
Montana Outdoors
Pilot
Backpacking
Horseman
Horse and Rider
Bowhunter
Backpacker
National 4-H Magazine

Special Interest Magazines with Other Emphases

Gourmet
Phi Delta Kappan
Popular Photography
Organic Farm and Gardening
Hot Rod Magazine
Flower and Garden
Dogs
Girl Scout Leader
Decorating and Craft Ideas
Americana
NAWCC Bulletin (clocks)
The Catholic Agitator
Apartment Life
Glamour
Early American Life
Organic Gardening
Sojourners
National Catholic Reporter
A.D. (Presbyterian Church)
Misc. Church Periodicals
Christian Reader
Rider
Car and Driver
Variety
Stereo Review
Prevention
Watchtower
Awake
Christian Science Journal and Sentinel
Modern Photography
Home Handyman
Plants Alive
Kappa Delta Pi
Outdoor Gardening
Bon Appetit
Guideposts
Beer Can Collectors of America Newsletter
Credit Union
Moving On

General Interest Magazines with News Emphasis

New Times
Time
Newsweek
U.S. News and World Report
People
Atlas World News Review
Ebony
Kiplinger Letter

General Interest Magazines with Features Emphasis

Topics
Good Housekeeping
Sphere
Michigan Alumnus
AAA Motor News (Michigan Living)
Esquire
Better Homes and Gardens
Woman's Day
Family Circle
New Republic
New Yorker
Reader's Digest
Atlantic Monthly
Consumers Report
Psychology Today
Southern Living
Ms.
House and Garden
Harper's
Aware
Redbook
Ladies Home Journal
McCall's
Fortune
Saturday Review
New Woman
Cosmopolitan
Rolling Stone
Playboy
Penthouse
Money
Monthly Detroit
Jet
Vogue
The American Home
Ideals

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