Changing Learner Behavior through Environmental Education

Harold R. Hungerford and Trudi L. Volk

Editor's Note: This is an article on research into responsible environmental behavior that has become something of a classic in the field of environmental education. In this reading Drs. Hungerford and Volk probe in some depth the research that has led to a refined model illustrating the variables which seem to be associated with citizenship behavior in EE. Having displayed and discussed this model of major and minor variables involved in environmental citizenship behavior, they identify a number of critical educational components in any instructional program which have been shown to impact on learners' citizenship behavior. They then present two different instructional models which have been shown effective in promoting responsible citizen behavior. This is followed by three major concerns held by the authors for the field which are related to the subject of the paper itself.

Editor's note [as published with the original article]:

In March 1990, several United Nations (UN) agencies jointly sponsored a worldwide conference on education entitled "World Conference on Education for All - Meeting Basic Learning Needs" as part of the UN proclamation of 1990 as the International Year of Literacy. The primary sponsoring agencies were UNESCO, UNDP, UNICEF; and the World Bank. The conference was held in Jomtien, Thailand. All UNESCO member nations were invited to send ministers of education and other representatives. In response, over 100 nations sent delegations, totaling more than 1,500 delegates. These included four heads of state, as well as educational experts and teams from a host of non-governmental organizations.

One of the conference's educational roundtables was entitled "Environmental Education: A Component of Sustainable Development." A number of professionals from different countries were invited to serve on this panel and to prepare papers on selected topics. Dr. Colin Power, UNESCO'S assistant director-general for education, served as the panel moderator. Panelists included: Dr. Michael Atchia, chief, Environmental Education and Training Unit, UNEP, Nairobi, Kenya; Dr. Thilla Chellia, Faculty of Education, University of Malaya, Kuala Lampur, Malaysia; Ms. Chodchoy Sophonpanvich, president, Thai Environment and Community Development Association; and Drs. Harold Hungerford and Trudi Volk, Faculty of Education, Southern Illinois University at Carbondale. The papers prepared and topics addressed by the panel were: environmental education; changing learner behavior; introducing environmental education into elementary schools; and the role of non-governmental organizations in environmental education. The paper prepared and delivered by Drs. Hungerford and Volk is published here in its entirety. The views expressed in this paper are those of the authors only and do not necessarily represent those of the sponsoring organizations.

The ultimate *aim* of education is shaping human behavior. Societies throughout the world establish educational systems in order to develop citizens who will behave in desirable ways. In education, some of the desired behaviors are sharply defined, e.g., skills useful in reading and mathematics. Other desired behaviors are more complex, e.g., successful consumerism, productive employment, responsible citizenship. It is on one of these latter behaviors, responsible citizenship, that this paper is focused. Specifically, this paper will address the effectiveness of environmental education for promoting responsible citizenship behavior.

How might responsible environmental behavior be operationalized? In order to answer this question, we must look to the objectives for environmental education (EE) as defined by the 1977 Tbilisi Intergovernmental Conference on Environmental Education. These objectives, which can be

found in the Tbilisi conference declaration (1978), are as follows:

Awareness - to help social groups and individuals acquire an awareness and sensitivity to the total environment and its allied problems [and/or issues]

Sensitivity - to help social groups and individuals gain a variety of experiences in, and acquire a basic understanding of, the environment and its associated problems [and/or issues]

Attitudes - to help social groups and individuals acquire a set of values and feelings of concern for the environment and motivation for actively participating in environmental improvement and protection

Skills - to help social groups and individuals acquire skills for identifying and solving environmental problems [and/or issues]

Participation - to provide social groups and individuals with an opportunity to be actively involved at all levels in working toward resolution of environmental problems [and/or issues]

By using these objectives, we might define an environmentally responsible citizen as one who has (1) an awareness and sensitivity to the total environment and its allied problems [and/or issues], (2) a basic understanding of the environment and its allied problems [and/or issues], (3) feelings of concern for the environment and motivation for actively participating in environmental improvement and protection, (4) skills for identifying and solving environmental problems [and/or issues], and (5) active involvement at all levels in working toward resolution of environmental problems [and/or issues].

The educational task, which is implied by the Tbilisi objectives, is an ambitious one. The citizenship behavior that they describe demands an educational thrust that goes beyond "basic" education in its traditional sense. Instead, we are faced with a set of objectives that paint a broad picture of behavior encompassing not only knowledge, attitudes, and skills, but also active participation in society. The challenge for educators is to translate the Tbilisi objectives into instructional reality. And, since the objectives focus on responsible behavior, it would be appropriate and helpful to consult traditional thinking about behavior as well as recent research into environmental behavior.

Traditional Thinking Versus Research Findings

The traditional thinking in the field of environmental education has been that we can change behavior by making human beings more knowledgeable about the environment and its associated issues. This thinking has largely been linked to the assumption that, if we make human beings more knowledgeable, they will, in turn, become more aware of the environment and its problems and, thus, be more motivated to act toward the environment in more responsible ways. Other traditional thinking has linked knowledge to attitudes and attitudes to behavior. An early and widely accepted model for EE has been described in the following manner: "[I]ncreased knowledge leads to favorable attitudes . . . which in turn lead to action promoting better environmental quality" (Ramsey and Rickson 1977). Both of these models are, in fact, very similar and can be illustrated as shown in Figure 1.

Research into environmental behavior, unfortunately, does not bear out the validity of these linear models for changing behavior. Numerous researchers have investigated a variety of variables hypothesized to be associated with responsible environmental behavior. Many studies have looked at only one variable at a time, and numerous of these have been correlational studies that cannot claim "cause and effect" relationships.

This is not to say that the research in the field has not been productive. Indeed, it has. However, to present a detailed survey of the research literature here would be an enormous task and detract from the major thrust of this document. Let us, at least

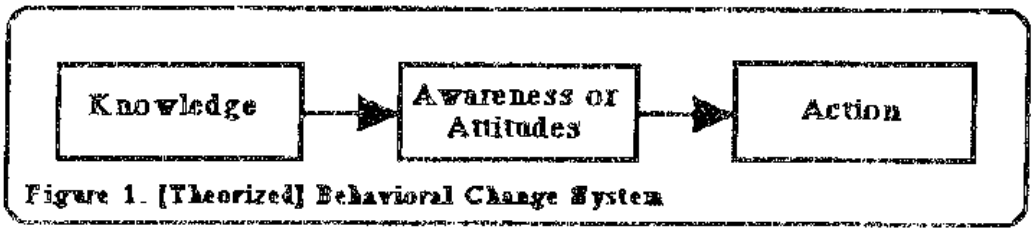

Figure 1. [Theorized] Behavioral Change System

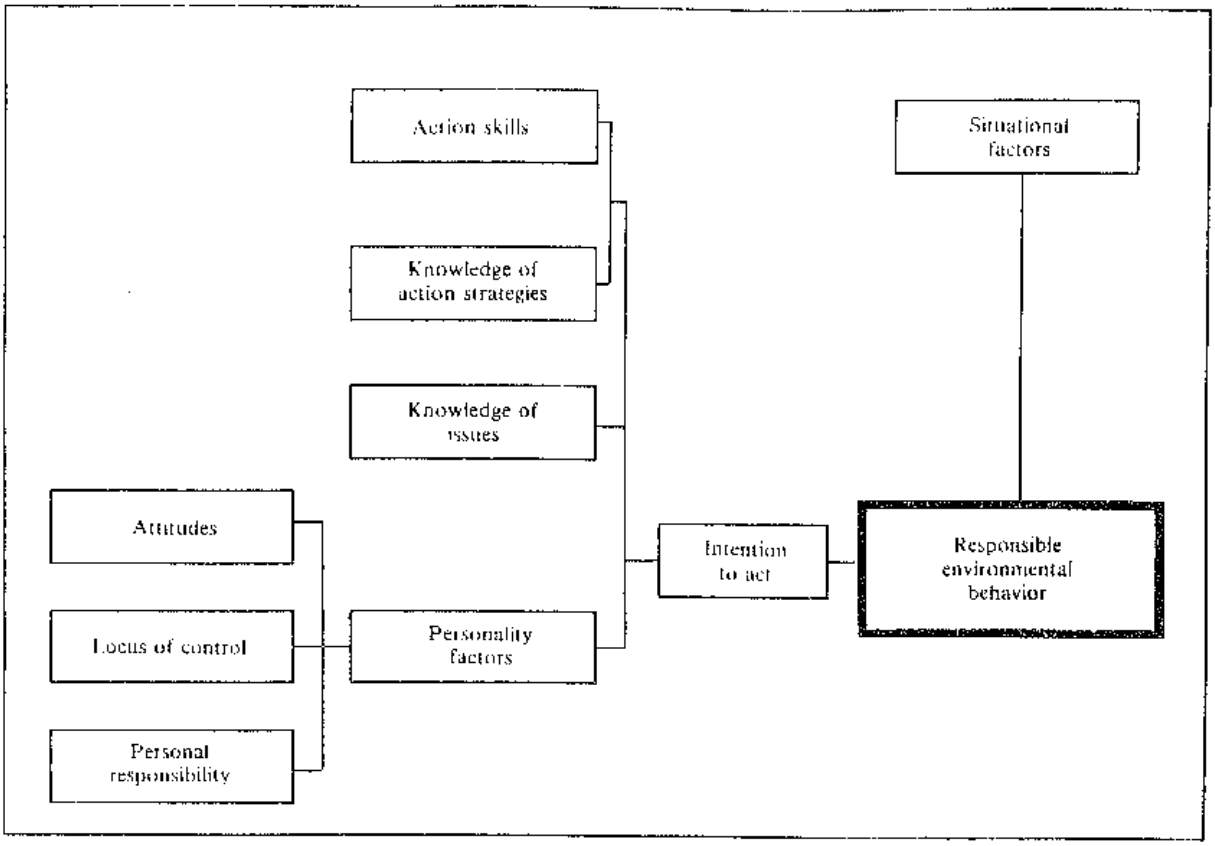

Figure 2. The Hines Model of Responsible Environmental Behavior (Adapted from Hines et. al. (1986/87

initially, transcend the bulk of that research by focusing our attention on one particular study which synthesizes the work that preceded it.

In 1986-87, Hines et al. published an important meta-analysis of the behavior research literature in EE. The researchers analyzed 128 studies

> ... which had been reported since 1971 ... which assessed variables in association with responsible environmental behavior and which reported empirical data on this relationship. . . . An analysis of data [from these studies] resulted in the emergence of a number of major categories of variables which had been investigated in association with responsible environmental behavior. . . In the end, fifteen separate variables were meta-analyzed in an effort to determine the strength of their association with environmental behavior. (p.3)

From this scientific analysis, a model of responsible environmental behavior emerged. This model is displayed in Figure 2. In discussing this model, Hines et al. made the following inferences:

> An individual who expresses an intention to take action will be more likely to engage in the action than will an individual who expresses no such intention. . . . However, . . . it appears that intention to act is merely an artifact of a number of other variables acting in combination, e.g., cognitive knowledge, cognitive skills, and personality factors.
>
> Before an individual can intentionally act on a particular environmental problem, that individual must be cognizant of the existence of the [issue]. Thus, knowledge of the [issue] appears to be a prerequisite to action.

[An] individual must also possess knowledge of those courses of action which are available and which will be most effective in a given situation.

Another critical component . . . is skill in appropriately applying this knowledge [i.e., knowledge of action strategies] to a given [issue].

In addition, an individual must possess a desire to act. One's desire to act appears to be affected by a host of personality factors. . . . locus of control, attitudes [toward the environment and toward taking action], and personal responsibility [toward the environment].

Situational factors, such as economic constraints, social pressures and opportunities to choose different actions may . . . serve to either counteract or to strengthen the variables in the model.

An Evolution of the Behavior Model

Concurrently with or subsequent to the Hines et al. research, a number of other researchers were making substantial contributions to the literature on behavior (Borden 1984-85; Borden and Powell 1983; Holt 1988; Koslowsky et al. 1988; Marcinkowski 1989; Ramsey 1989; Sia et al. 1985-86; Simpson 1989; Sivek 1989). Some of this research focused on the precursors (predictors) of behavior and some on the outcomes observed from instructional strategies which incorporated a number of the variables from the Hines et al. model.

These studies, coupled with the Hines et al. model, revealed that there are probably three categories of variables that contribute to behavior. The variable categories (entry-level variables, ownership variables, and empowerment variables) are hypothesized to act in more or less of a linear fashion, albeit a complex one. These variables are displayed in Figure 3, the behavior flow chart.

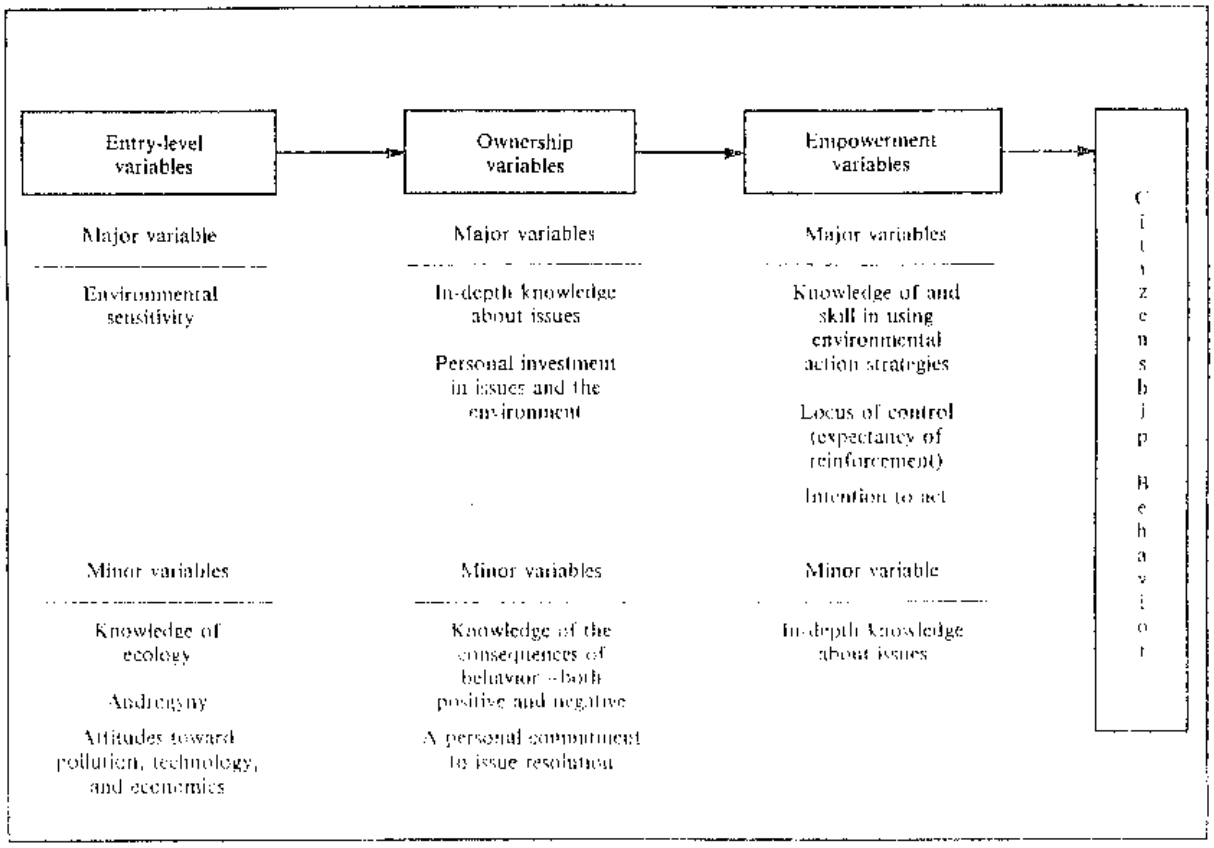

Figure 3. Environmental Behavior Model: Major and Minor Variables Involved in Environmentally Responsible Behavior.

Variables in the Behavior Flow Chart

In the discussion that follows, an attempt is made to describe the variables listed in the behavior flow chart. At certain points, comments are made about the synergistic relationship that appears to exist between certain closely related variables. The reader is cautioned to keep in mind that all of the variables discussed below probably operate in some sort of synergistic manner. While the categories of variables probably operate in a linear fashion, the variables within each category do not necessarily operate in a similar manner. It should also be noted that more research is needed to fully understand the relationships between these variables and behavior.[2]

Entry-Level Variables

Entry-level variables are good predictors of behavior or ones that appear to be related to responsible citizenship behavior. These appear to be prerequisite variables or, at the very least, variables that would enhance a person's decision making, once an action is undertaken. These variables will be briefly introduced here. Subsequently, several will be discussed in more detail.

Environmental sensitivity is defined as an empathetic perspective toward the environment. It is the one entry-level variable that has shown a dramatic relationship to behavior in the research.[3] Given these data, considerable attention must be given by environmental educators to this variable.

Androgyny [in a psychological sense] is a variable that is often associated with individuals who are active in helping resolve environmental issues. Androgyny refers to those human beings who tend to reflect nontraditional sex-role characteristics. For example, an androgynous male may be a very sympathetic individual and able to cry in a sad situation (a traditional female characteristic). An androgynous female, for example, may exhibit certain male characteristics such as assertive behavior. Androgyny is not as strong a predictor as environmental sensitivity.

Knowledge of ecology is listed here because it is almost always prerequisite to sound decisions regarding solutions to issues. "Knowledge of ecology" refers to an ecological conceptual basis for decision-making, e.g., concepts associated with population dynamics, nutrient cycling, succession, homeostasis, etc. The research would indicate that knowledge of ecology does not, in itself, produce environmental behavior. Still, it is an important variable when one considers the importance of ecological concepts in decision making.

Attitudes toward pollution/ technology/ economics are variables that have shown themselves to be significant in some of the research.[4] Although these attitudes appear to be involved with behavior, the extent of their involvement is still unknown and, thus, they are shown here as minor variables.

Ownership Variables

Ownership variables are those that make environmental issues very personal. The individual "owns" the issues, i.e., the issues are extremely important, at a personal level, to him/her. Much of what we know about "ownership" is inferred from a variety of studies. Ownership variables appear to be critical to responsible environmental behavior.

In-depth knowledge (understanding) *of issues* appears crucial to ownership. A number of important studies have addressed this variable.[5] It appears that, before individuals can engage in responsible citizenship behavior, they must understand the nature of the issue and its ecological and human implications. When individuals have an in-depth understanding of issues, they appear more inclined to take on citizenship responsibility toward those issues.

Personal investment in an issue or an action is another variable that we hypothesize to be a major factor in this category. Personal investment is much like "ownership" itself. Here the individual identifies strongly with the issue because he/she has what might be called a proprietary interest in it. For example, an individual who thoroughly understands the economics of recycling and who uses a substantial amount of recyclable material might feel a substantial personal economic investment in recycling. However, the motivation might not necessarily have to be economic. It could be environmental in nature if the person has good ecological concepts about waste disposal, biodegradability and nutrient cycles and understands the broad human involvement in these things. Recycling might, then, become a strong personal need which could be translated as "personal investment."

Empowerment Variables

Empowerment variables are crucial in the training of responsible citizens in the environmental

dimension. These variables give human beings a sense that they can make changes and help resolve important environmental issues. "Empowerment" seems to be the cornerstone of training in environmental education. Unfortunately, it is a step that is often neglected in educational practice. A discussion of "empowerment variables" follows.

Perceived skill in using environmental action strategies is one of the very best predictors of behavior.[6] Simply put, perceived skill in using action strategies can be translated as human beings believing that they have the "power" to use citizenship strategies to help resolve issues. Further, these skills are fairly easy to teach to learners.

Teachers trained in this strategy report that students tend to develop a great deal of self-confidence as a result of this training. Training in action skills also results in improved students' self-concepts and a belief that they have been more fully incorporated into society. These are very powerful considerations when making students more responsible citizens in their own communities.

Knowledge of environmental action strategies is a variable that sometimes shows a relationship to behavior in the research (Holt 1988; Klingler 1980; Ramsey 1989; Ramsey et al. 1981; Simpson 1989). The extent to which this variable is separate and apart from "perceived skill in using action strategies" is unknown. It is probable that the skill component is dependent on the knowledge variable to a great extent. Knowledge about action strategies per se is not as powerful a predictor as the skill variable. This explains why these two variables are listed together in the behavior flow chart.

A word of caution may be necessary here. In the studies that examined behavior, learners gained an in-depth knowledge of issues as well as learning about action strategies. It is suspected that these two major variables operate synergistically, not separately. Thus, it would appear unlikely that citizenship action skills taught without issue-related knowledge would prompt responsible behavior in individuals.

Locus of control, although not as good a predictor as perceived skill in using action strategies, is important also, and, like many of the other variables discussed here, this one is probably interconnected with others.

Locus of control refers to an individual's belief in being reinforced for a certain behavior. A person with an "internal locus of control" expects that he/she will experience success or somehow be reinforced for doing something. Success, in turn, appears to strengthen his/her internal locus of control. On the other hand, a person with an "external locus of control" does not believe that he/she will be reinforced for doing something and, therefore, probably will not do it.

An individual who believes that he/she has good fishing skills is more likely to attempt fishing because there is an expectation of success or reinforcement for this behavior. This person has an internal locus of control for fishing. An individual who believes that he/she is powerless to make changes in society probably will not act in a citizenship dimension. There is no expectation of success or reinforcement for acting. This person would have an external locus of control for trying to help resolve environmental issues.

An internal locus of control probably cannot be developed *directly* in the classroom. However, there is research that indicates that locus of control can be improved as a consequence of teaching citizenship action skills. An improved locus of control may well result when students have had an opportunity to apply these skills successfully in the community.

Intention to act seems also related to the "empowerment" variable. If a person intends to take some sort of action, the chances of that action occurring are increased. It is likely that this variable is closely related to both perceived skill in taking action and locus of control. "Intention to act" may also share a synergistic relationship with "personal investment," which was discussed earlier under the "ownership" heading.[7]

Goals and Objectives for Instruction in Environmental Education

Behavior in the environmental dimension can be perceived as so very complicated as to make instructional planning difficult. This difficulty (as well as a lack of research into the precursors of behavior and instructional strategies designed to change behavior) probably resulted in the model that knowledge leads to awareness which leads to behavior.

There has been a great deal of criticism about the lack of direction in EE over the past 15 years.[8] The lack of emphasis upon objectives that focused on helping students actually solve environmental problems and develop problem-solving skills is contrary to the recommendations for environmental education objectives contained in both the 1977

Belgrade Charter and the 1977 Tbilisi Intergovernmental Conference Report.[9]

The answer to some of these concerns might be found in instructional goals for environmental education that incorporate the variables related to "ownership" and "empowerment."[10] Such a set of goals was developed in the early '80s and has subsequently been used throughout the world as a guide for curriculum development and research. This set of goals identifies a "superordinate goal" which follows:

> *The superordinate goal:* . . . to aid citizens in becoming environmentally knowledgeable and, above all, skilled and dedicated citizens who are willing to work, individually and collectively, toward achieving and/or maintaining a dynamic equilibrium between quality of life and quality of the environment.

Four major goal levels as well as subgoals were developed to help accomplish the superordinate goal. The goal levels are presented below.

> *Goal Level I: The Ecological Foundations Level.* This level seeks to provide learners with sufficient ecological knowledge to permit him/her to eventually make ecologically sound decisions with respect to environmental issues.
>
> *Goal Level II: The Conceptual Awareness Level-Issues and Values.* This level seeks to guide the development of a conceptual awareness of how individual and collective actions may influence the relationship between quality of life and the quality of the environment and, also, how these actions result in environmental issues that must be resolved through investigation, evaluation, values clarification, decision making, and finally, citizenship action.
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> *Goal Level III: The Investigation and Evaluation Level.* This level provides for the development of the knowledge and skills necessary to permit learners to investigate environmental issues and evaluate alternative solutions for solving these issues. Similarly, values are clarified with respect to these issues and alternative solutions.
>
> *Goal Level IV: Action Skills Level-Training and Application.* This level seeks to guide the development of those skills necessary for learners to take positive environmental action for the purpose of achieving and/or maintaining a dynamic equilibrium between quality of life and quality of the environment.

Educating for a Change in Behavior

What Are the Critical Educational Components?

Given all that has preceded this section, one should be able to identify a number of critical components of a total educational program for environmental education if changes in learner behavior are desired. Among these critical components are ones which can be facilitated by formal and nonformal educational agencies (see Table 1).

Comments on Implementing the Critical Components

Certainly, there is no one best way to implement these components in an instructional setting even though the research provides the reader with some meaningful clues concerning important and successful strategies. And it may be that it will take a concerted, cooperative effort among educational institutions to meet the challenge of changing learner behavior. Certainly, an articulated implementation across grade levels and the cooperation of nonformal educational agencies as well as local and regional educational resources would maximize the opportunity for success.

What are some successful strategies for meeting the implementation challenge? What are some cautions that should be kept in mind while implementing the important components? Most of the components listed in Table 1 will be discussed here in some detail. However, first let us focus on at least one overall strategy that seems to be especially critical.

The Need for a Reinforcement Strategy

Educators must not assume that one course or one unit or one year of training will accomplish the task needed even though a number of studies have shown that certain strategies for changing behavior are successful (Holt 1988; Klingler 1980; Ramsey 1989; Ramsey et al. 1981; Simpson 1989).[11] Associated with one of these studies (Ramsey et al.

TABLE 1. Critical Education Components

It appears that we can maximize opportunities to *change learner behavior* in the environmental dimension if educational agencies will:

1. teach environmentally significant ecological concepts and the environmental interrelationships that exist within and between these concepts;
2. provide carefully designed and in-depth opportunities for learners to achieve some level of environmental sensitivity that will promote a desire to behave in appropriate ways;
3. provide a curriculum that will result in an in-depth knowledge of issues;
4. provide a curriculum that will teach learners the skills of issue analysis and investigation as well as provide the time needed for the application of these skills;
5. provide a curriculum that will teach learners the citizenship skills needed for issue remediation as well as the time needed for the application of these skills; and
6. provide an instructional setting that increases learners' expectancy of reinforcement for acting in responsible ways, i.e., attempt to develop an internal locus of control in learners.

1981) was an important but unpublished follow-up investigation conducted three years after Ramsey measured the effects of three different treatments on the environmental behavior of eighth-grade students.

Three years after Ramsey completed his initial investigation, he trained several graduate students to act as interviewers and took them to the secondary school where the original subjects were students. The interviewers were trained to assess the extent of student involvement in environmental issues and environmentally appropriate behavior. The interviewers were not told which students had been in the experimental group and which had been in either of the control groups. Interestingly, the interviewers could identify each of the students who had been in the experimental group. The subjects *were involved in more environmentally appropriate behaviors* than their counterparts. However, it was clear that the original behavior observed in the eighth grade had eroded over time. There had been no intervening educational reinforcement for the students over a three-year period. Thus, it seemed obvious that, even though the experimental subjects were more environmentally involved, some sort of intervening treatment would have been needed to maintain the original level of involvement.

In light of Ramsey's follow-up study, it seems obvious that learners need to be reinforced for positive environmental behavior over time. No definitive recommendations about the extent of instructional reinforcement will be made here. There is simply no research to validate how much is needed. However, it is evidently imperative that learners get in-depth educational experiences over a substantial amount of time.

Thoughts on the Sensitivity Component.

Environmental sensitivity is a particularly troublesome variable for many educators who understand its importance. The variables associated with sensitivity are often not associated with formal education.

Several research studies have focused on "sensitivity" (Peters-Grant 1986; Peterson 1982; Scholl 1983; Tanner 1980). These studies yielded similar results concerning the precursors to environmental sensitivity. It appears that "environmental sensitivity" is a function of an individual's contact with the outdoors in relatively pristine environments either alone or with close personal friends or relatives. The environmentally sensitive individuals reported hunting, fishing, and other outdoor activities as important variables. Of great importance is the fact that they reported that these activities took place over long periods of time.

Numerous sensitive individuals reported that some experience with severe environmental degradation substantially increased their environmental sensitivity. Some sensitive individuals reported the importance of teachers who acted as sensitive role models for them. Others reported being raised in an environmentally sensitive social environment. Only a few reported the importance of educational courses or books.

If these research studies are to help us make educational decisions about developing environmental sensitivity, it seems important that learners have environmentally positive experiences in nonformal outdoor settings over long periods of time. And, in the formal classroom, we must look to teachers who are, themselves, sensitive and willing to act as positive role models for learners. Both of these conditions, for millions of learners, are hard to meet.

Accomplishing the Issue Investigation, Action, and Knowledge Components: Two Recommended Approaches.

These variables are collapsed together in this heading because there is research evidence that these can be met simultaneously in a formal instructional setting. (Holt 1988; Klingler 1980; Ramsey 1989; Ramsey et al. 1981; Simpson 1989). In each of these studies, behavior changed positively as a consequence of instruction that focused on ownership and empowerment. Of great importance is the fact that, in all cases, students were shown to participate in more environmentally appropriate behaviors out of school after instruction.

The instruction used in each of these studies focused on the goal levels cited earlier with the exception of the ecological foundations goal. That particular goal (ecological foundations) was met earlier in the learner's schooling. Thus, Goals II, III, and IV were part of the instructional design. In all cases, the instruction involved the use of one of two curricular strategies (Hungerford et al., 1988; Marcinkowski, et al. 1990; Hungerford, et al. 1990).

Two Curricular Strategies: the Issue Investigation and Action Model and the Extended Case Study Model

In the issue investigation and action model, the student learns to discriminate between environmental events, problems, and issues. The impact of beliefs and values on issues is emphasized, and an issue analysis strategy is introduced and practiced. Students then learn how to identify environmental issues, write research questions focused on these issues, and learn how to obtain information about issues using secondary sources. They also learn how to compare and evaluate secondary information sources. They then learn how to develop surveys, opinionnaires, and questionnaires and how to sample populations in order to obtain scientifically valid information. In addition, they are taught how to record data, interpret the data, make inferences about the data and draw recommendations from these inferences. At this time, each student chooses an issue of particular interest to him/her and investigates that issue in depth. Subsequently, the student prepares a report on that investigation and tenders a written report to the instructor and an oral one to his/her peers.

After the students have completed their issue investigations, they learn the major methods of citizenship action, analyze the effectiveness of individual action versus group action, and develop issue-resolution action plans. This action plan is evaluated against a set of criteria designed to assess the social, cultural, and ecological implications of the action. Finally, the students decide whether they want to actually implement the plan of action. If they choose to implement their action, the instructor helps to facilitate this citizenship behavior.

In the extended case study model, the students learn some of the same skills that were learned in the other model except that they do so focused on a predetermined issue, sometimes chosen by the class but most often chosen by the instructor. The research indicates that the extended case study model, although successful, is not as powerful an instructional model as the issue investigation and action model.

Selected educational characteristics of both models are illustrated in Table 2. The characteristics displayed are for ages 6 to 17 (Grades 1 to 12) only. It is important to note, however, that the issue investigation and action model has been used very successfully with both undergraduates and graduate students in university teacher education programs in the U.S.[12]

Effectiveness of Environmental Education Around the World

Has environmental education been effective on a global basis? In citing evidence of success, we might point to nations that have made a concerted effort to mount environmental education programs. We might also note the many national and international leaders who are hard at work trying to implement EE. Numerous organizations also advocate and/or deliver environmental education programs. In addition, there are curricular materials from formal and nonformal educational agencies, media campaigns, adult education programs, outdoor education programs, conservation education programs, and other vehicles that attempt, in one

way or another, to change human behavior in an environmental dimension.

Evidence of success might also be seen in the numerous stories telling what young students and adult activists have done regarding issues (see Appendix B for examples). Some of these anecdotes have originated from students who have learned issue investigation and citizenship action skills in school. Some of these anecdotes have originated from excellent conservation education programs designed to teach adolescents and preadolescents sound conservation practices. Some have originated from governmental agencies, which are funded to help humans learn how to conserve natural resources. Others come from private agencies that strive to help human beings confront issues and deal responsibly with the environment. Still others originate in agencies that have a major responsibility for environmentally related law enforcement.

Does this wealth of evidence speak to the effectiveness of environmental education? Before reaching that decision, it may be wise to consider additional evidence. We urge responsible citizens and educators to consider three main concerns.

Concern No. 1: We Seem to Be Losing the Battle for the Environment

Regardless of what we as educators would like to think, we can point to relatively few successes that offset the severity of environmental degradation and the serious problems associated with human reproductivity. This is a bitter concept for educators to accept. Although we are prone to defend our practices in EE, we must stop and evaluate how successful we are in the overall battle to resolve urgently important environmental issues. It is not our purpose here to put forward a litany of truly critical environmental issues facing human beings today. But, if we did, this listing would enormously outweigh the successes in changing environmentally related behavior around the world. *Thus, when current reports on environmental quality are considered, we must admit that we have not been successful, on a widespread basis, in convincing world citizens to act in environmentally responsible* ways.

Concern No. 2: There Are Too Few Sound National Strategies for EE

In numerous countries (including the authors' own), EE is a step-child of education, or it receives only sporadic attention. Relatively few nations have made a commitment to EE programs that involve students throughout their schooling and that utilize a carefully constructed, research-based scope and sequence. Where EE exists, students typically receive incidental exposure to environmental issues, with the emphasis on the ecological foundations and/or awareness levels. *Thus, there appear to be few concerned nationally focused efforts that prepare future citizens to make environmentally sound decisions or to participate responsibly in environmental maintenance and remediation. As a result, only a fraction of our young learners are being exposed to logically developed, well-articulated EE programs.*

Further, there are relatively few efforts to try to change environmental behavior through the media. Certainly, there are nations that can point to television programming that focuses attention on environmental issues, wildlife, or natural ecological systems. In almost all instances, however, these media presentations deliver information about the environment and about environmental issues. Few media events focus on skills associated with individual citizen's ownership and empowerment. Similarly, with few exceptions, the number of people watching these programs is relatively small compared with the population as a whole. Further, when print sources are focused on environmental issues, those issues are frequently ones that appear newsworthy to editors, and coverage is almost totally at an issue awareness level. Without opportunities for ownership or empowerment, it appears unlikely that these efforts will move the public to widespread participation in environmental responsibility. *Thus EE media efforts tend to focus on the awareness level (which tends to be ineffective in changing behavior) and often fail to reach a large audience of learners.*

Concern No. 3: Educators Are Focused on the Wrong Strategies

A similar situation exists in the instructional materials used in formal educational settings. By and large, these materials are designed to provide information: information about ecology ... information about the environment ... information about environmental issues. Too few EE programs incorporate serious attempts to develop ownership and empowerment in learners. Again, these educational efforts typically focus only on the awareness level. Environmental educators overwhelmingly agree that the major aim of EE is to produce individuals who will willingly and responsibly participate in environmental maintenance and remediation. *Unfortunately, the majority of instructional materi-*

als in EE fail to develop skills associated with investigating and evaluating issues or with responsible citizen participation.

In addition, most success stories are issue-specific in nature. In other words, most successes revolve around educational efforts designed to help resolve specific issues. The knowledge and skills learned are focused on a particular issue, e.g., endangered species, solid waste management, safe water supplies, forest conservation, etc. We cannot argue the importance of attending to these issues where they are locally important. However, in many instances, this strategy is seriously flawed. The flaw in this one-issue strategy centers on "generalizability." It is relatively easy to get learners focused on an issue, particularly if it is one of interest or importance to them. In many instances, educators can also engage learners in citizenship action strategies related to that issue. Unfortunately, with a single-issue focus, there exists very little opportunity to generalize the knowledge and skills to other issues (unless they are closely related to the first one). *Thus the results of our efforts are learners who may act in an environmentally positive manner with relation to one issue (or set of issues), but who do not have the knowledge, skills, and willingness to assume environmental responsibility in their day-today lives.*

In Closing

One of the serious impediments to the kind of instruction recommended in this document is the fact that it differs substantially from typical educational practice. As stated before, most educators firmly believe that, if we teach learners about something, behavior can be modified. In some cases, perhaps, this is true. However, in educating for generalizeable responsible environmental behavior, the evidence is to the contrary. Typically, *issue awareness does not lead to behavior in the environmental dimension.* This means that we must look to a new model of instruction if behavior is important. And, because all environmental behavior is somehow issue related, it appears as though *issues must be the focus of instruction* beyond environmental sensitivity, ecological foundations, and issue awareness.

If environmental issues are to become an integral part of instruction designed to change behavior, instruction must go beyond an "awareness" or "knowledge" of issues. Students must be given the opportunity to develop the sense of "ownership" and "empowerment" so that they are fully invested in an environmental sense and prompted to become responsible, active citizens.

The research is very clear on the matter. Citizenship behavior can be developed through environmental education. The strategies are known. The tools are available. The challenge lies in a willingness to do things differently than we have in the past.

Acknowledgments

The writers are indebted to many human beings around the world who have worked diligently to make environmental education a meaningful experience for learners. We most certainly stand on the shoulders of giants and acknowledge their contributions to this paper (both instructionally and in a research context) . Only a few of these have been cited in order to make this document as readable as possible.

In the development of this paper, one person stands out above all others. Dr. Thomas Marcinkowski of [The Florida Institute of Technology] has been an enormous help to the writers and has assisted with the formulation of ideas and with the behavior model seen earlier. He should also be given credit for [furnishing] the bulk of the citations that appear in Appendix C of this paper.

Notes

1. The writers believe that the terms "problems" and "issues" should be used differently. Although some writers use these terms synonymously, distinguishing between them helps learners to conceptualize them differently. An environmental "problem" exists when something is at risk, for example, an animal becomes endangered. An environmental "issue" exists when human beings have differing beliefs and values concerning what should be done about the problem. For example, people may differ in their beliefs about what should be done to manage the endangered animal. This situation exists in very real dimensions throughout the world. A specific example would lie with the African elephant. Its endangerment is an environmental "problem." How to manage the elephant has become an "issue."

2. The model presented in this paper "reflects variables associated with the prediction of, modification of, and explanation for the relative frequency with which citizens engage in this broad [range] of behaviors. ... an emphasis has been placed on variables which may be attended to in educational pro-

grams, i.e., programs designed to modify the frequency of such behavior," (Marcinkowski 1990).

3. In the research conducted by Sia et al. (1985/86) sensitivity predicted nearly 13% of the variance in his overall sample. It predicted over 45% of the variance in his non-environmental group, a sample of 66 elders in an Elderhostel Program in southern Illinois. And, it predicted nearly 10% of the variance in his sample of environmental organization members. It was also a major predictor variable in the research conducted by Sivek (1989) for at least one of his environmentally allied groups in Wisconsin.

4. Marcinkowski (1989) found that these variables were significant predictors of behavior. Sia (1985/86) measured only pollution and technology and did not find them as salient as did Marcinkowski.

5. Using curricula that involve students in investigating and evaluating issues, Holt (1988), Klingler (1980), Ramsey (1989), Ramsey et al. (1981), Simpson (1989) and others have demonstrated that middle school students definitely participated in more positive environmental behaviors subsequent to that instruction. Ramsey et al. (1981) also confirmed this observation by surveying the parents of the students.

6. In Sia's research (Sia et al. 1985), perceived skill in using environmental action strategies accounted for nearly 35% of the variance for predicting environmental behavior when all of the samples were considered together.

7. Kosłowsky et al. (1988) studied the impact of intention and investment on behavior (although their research was not conducted with respect to environmental issues). They found that "maximum prediction is attained by using only two variables, intention and investment, and their interaction." The research conducted by Hines et al. (1986/87) looked at "intention to act" as a contributing variable to environmental behavior. They suggested that "intention to act" appears to be "an artifact of a number of other variables acting in combination, e.g., cognitive knowledge, cognitive skills, and personality factors."

8. There is no lack of criticism and comment in the literature about the lack of direction in environmental education. In 1975, Vande Visse and Stapp warned that " ... without a clear statement of goals, an environmental education program would become a series of unrelated experiences, focusing on limited program objectives." Roth, in 1976, confirmed this prediction by stating that "the presence of environmental education in public school curricula [U.S.A.] can often be characterized by loose organization and little sense of direction." In 1977, Harvey set about to analyze instructional models in the field and found that there was little agreement about what constituted a model for environmental education.

In 1978, Childress reported on a major research study into environmental education programs in the U.S. (surveying 301 EE programs and projects) and found that less than 40% of those surveyed considered the following objectives to be primary objectives: synthesizing various alternative solutions to environmental problems into a comprehensive plan; analyzing the role of contributing factors (technology, legislation, etc.) to the causes of environmental problems; evaluating how varying value systems modify and shape the environment; and developing proficiency in environmental data collecting techniques.

Childress concluded from his study that objectives focused on helping students become knowledgeable about their environment and its associated problems, and developing an appreciation of environmental resources, were considered of more importance in a majority of programs than objectives focused on helping students actually solve environmental problems and develop problem-solving skills.

9. Several important research studies, not discussed here, have dealt with needs in environmental education relative to goals for EE. These provide substantial insight into the perspectives of teachers and EE professionals regarding the status of EE, both nationally and internationally, and specific needs for changes in curriculum, instruction, and teacher education. These would include Champeau et al. (1980); Peyton (1977); Stevenson (1986); UNESCO (1978); Volk et al. (1984) and Wilson (1988).

10. Using the Tbilisi objectives as a framework and Harvey's (1977) "Superordinate Goal for Environmental Education," Hungerford et al. (1978/1980) developed a set of goals and subgoals that appeared to be philosophically and hierarchically valid. An original set of goals was presented to a working group of the 1978 National Conference on Environmental Education [U.S.A.]. A revised set of validated goals was then published in 1980.

11. Among these studies are the Asche and Shore (1975) research on conservation behavior conducted in Canada and the Ramsey studies with seventh and eighth-grade students (Ramsey et al., 1981; Ramsey 1989) conducted in the U.S.

12. With respect to the two instructional models recommended here, the issue investigation and action model and the extended case study model, examples of these are commercially available and can be obtained from Stipes Publishing Company, 10 Chester Street, Champaign, Illinois (USA) 61820. The Issue Investigation and Action Model is entitled *Investigating and Evaluating Environmental Issues and Actions* (Hungerford et al. [1996]). The Extended Case Study Model is entitled *A Science-Technology-Society Case Study: Municipal Solid Waste* (Ramsey et al. [1996]).

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Appendix A: Goals For Environmental Education

[Note: Appendix A has been deleted from this reading since the original document can be found in its entirety elsewhere in this book. That article was originally published in the Journal of Environmental Education in 1980 and was entitled, "Goals for Curriculum Development in Environmental Education."]

Appendix B: Citizenship (Action) Vignettes

Central Illinois, United States

After surveying local residents regarding their attitudes toward the recycling of aluminum beverage containers, an eighth-grade student in a medium-sized town in central Illinois visited the mayor and shared the results of her issue investigation and survey. The mayor was so impressed with her findings that he invited her to address the city council. As a result of her survey and work with the city council, the town now has two recycling centers.

Cameroon

In Cameroon, an agricultural extension officer visits a village and teaches the farmers how to cultivate their land on the contour in order to keep soil from washing away. Instead of cultivating crops uphill and downhill as they had done before, they now work the land so as to save valuable top soil.

Midwestern United States

In a rural Midwestern community in the U.S., several junior high students became interested in a local land-use issue. The debate centered on the use of a section of state-owned land adjacent to a local river. After conducting a county-wide survey, these students used their findings to develop a master plan for the use and development of that public land, and submitted and defended the plan at a public hearing sponsored by the state Department of Conservation.

Among the farmers, businessmen, bird watchers, recreationists, and others who spoke at the public hearing, these students were the only participants who presented a proposal founded on data-based decision making. The master plan, which was ultimately adopted, was very similar to their proposal.