



Universidad de Jaén

**COMPARATIVE STUDY OF A PROJECT-BASED PEDAGOGICAL
ENVIRONMENTAL SCIENCE ON ISRAELI PARTICIPANTS AND
NON –ISRAELI PARTICIPANTS ATTITUDES AND INQUIRY-BASED
PRACTICE IN SUSTAINABILITY IN EDUCATION.**

**ESTUDIO COMPARATIVO DE UN PROYECTO PEDAGÓGICO DE CIENCIA
AMBIENTAL SOBRE LAS ACTITUDES DE LOS PARTICIPANTES ISRAELÍES
Y NO ISRAELÍES Y LA PRÁCTICA BASADA EN LA INVESTIGACIÓN SOBRLA
SOSTENIBILIDAD EN LA EDUCACIÓN.**

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Abstract

Study of ERBs (Environmental Responsible Behaviors) is a complex, owing to several socio-demographic factors like education level, income, and political orientation that can influence behavior: Socio-demographic factors values, attitudes, and worldviews Environmentally Responsible Behavior.

In this study, non-Israeli teachers and Israeli teachers who participated in this research, are in the Ofri International Training Center, part of the Ministry of Education. Socially, economically, and environmentally sustainable development is a primary objective of its activities, and it participates actively in the international Global Sustainable Development Goals (SDGs) 2030. The course curriculum included activities that linked the science content related to Globe Project with the social, cultural and political context in which that knowledge is evaluated. The population of study was science teachers/educators, totally 120 teachers /educators in each group. Both groups were contacted for permission to conduct the survey. The sample population (treatment group) consisted of 120 teachers from different countries, mainly developed countries who completed the course. A second group of 80 participants, who did not complete the course, were randomly selected for the control group. Non-Israeli and Israeli participants' attitudes about water-related environmental issues were measured using the Survey of Environmental Attitudes and the Teachers Interviews Protocol. The survey was administered and interview protocol in Israel. Random samples of both participants can be assigned to the experimental and control groups.

The non-Israeli participants who completed the Course Curriculum were all enrolled in environmental education classes and presented significantly more positive water-related environmental attitudes than Israeli participants, only 48 percent of whom were enrolled in environmental science classes. Specifically, do attitudes depend on a longer and more sweeping exposure to global environmental issues?

When comparing the Israeli and Non-Israeli participants, the Israeli participants' verbal commitment attitudes were more positive than the non-Israeli students (for the treatment and control groups), but not significantly. The differences in the level of participants' environmental knowledge are possibly related to the difference across all these subscales: verbal commitment, actual commitment, and affect.

Participants' responses to the questions related to the Survey of Environmental Attitudes were very much correlated with the results of the t-tests and chi-square analysis. The results of this study recommend that further research be conducted to assess the impact of the Curriculum on a larger participants population from both Israeli and non-Israeli countries.

A proposed model has been presented in two main templates: The pedagogical template and the social template, which are related to an environmentally reasonability behavior. One of the main components which reflect on environmental responsibility is the environmental literacy including digital technologies.

By providing the missing services that are vital to a better quality of life, it will increase the capacity of future generations to provide them in a way that maintains environmental integrity, fosters social equity, and facilitates economic prosperity.

1. Introduction

Research Actuality

Children today have fewer opportunities to experience the outdoors, despite the fact that the natural environment has played an integral role in human development for thousands of years. Indirect exposure to nature, often achieved through school and the media, are inadequate substitutes for direct encounters with local ecosystems. As children become deprived of authentic outdoor experiences, their perception of nature changes profoundly, which adversely impacts their development.

However, environmental education (EE) represents a potential way to counter the effects of this nature-deficit disorder. Yet, there should be a balanced relationship between human and natural environment. Introducing sustainable development as the accepted concept for development in 1987, the World Commission on Environment and Development mentioned it was aimed at to strike a balance between protecting the environment and providing for present and future generations.

Education is a crucial agent for achieving sustainable development and creating an environmentally literate society—a society motivated and equipped to influence decision making (Orr; UNESCO-UNEP, 1976, 1978, 1995).

Today, one of the most significant challenges for EE is strengthening professional development for teachers, including preservice education. The study of cultural and ecological integrity of the places people live is integral to education for sustainable development, which addresses environmental and cultural preservation and degradation (Orr 1994; Woodhouse and Knapp 2000).

It is essential for people to know and understand their local environment, listen to others and live-in harmony with it in order to achieve cultural and local sustainability. On the other hand, EE should be developed by taking into consideration the physical and social conditions of each country. Despite its small population, Israel has experienced rapid industrialization, rapid development, and urbanization over the last few decades, which has recently improved management of protected areas, more international cooperation, and a national biodiversity strategy. However, environmental education includes science content, it also encompasses mathematics, politics, economics, civic responsibility, fine arts, and understanding historical knowledge.

As a result of being exposed to the pedagogy, the students learn to express their responsibility towards their surrounding environment, depending on what is taught in EE programs, development of sustainable lifestyles and respect for nature may or may not occur as a result of personal behavioral choices (Keene and Blumstein 2010). Teaching environmental education should initially focus on local environments where students can engage with natural environments, they are already familiar with.

If a person does not understand his or her local environment, he or she might perceive rainforests, deserts, oceans, and air as something that someone else needs to concern themselves with. The development of environmental attitudes and awareness can be enhanced through environmental programs geared toward children from an early age, which may help them to improve more effectively and to develop environmental stewardship values (Evans et al., 2017).

It has often been claimed that environmental education is the panacea for many environmental problems, but quality improvement in education is essential to creating an environmentally literate population in the long run (Smyth, 2005).

Children's science achievement is improved by EE in public schools, but most children's science achievement is measured only by standardized test scores, which are purely cognitive (Coyle, 2005). It would be beneficial for program evaluations to incorporate more of these measures to provide better indicators of conservation behavior. (Stern, 2000). A limited amount of empirical research has examined how EE affects environmental attitudes, knowledge, and behavior of teachers, and this limited body of research indicates that EE influences environmental attitudes and knowledge in different degrees (American Institutes for Research, 2015; Leeming, Dwyer, Porter, & Cobern, 1993; Smith-Sebasto, 2012).

Some studies have shown that EE had a positive impact on attitudes and awareness (Bogner, 1998), while others revealed no significant attitude changes (Legault & Pelletier, 2000; Shepard & Speelman, 1985). It was not always possible to achieve substantial knowledge gains without affecting attitudes, and it was not always possible to achieve significant knowledge gains without fostering positive attitudes. (Leeming, Porter, Dwyer, Cobern, & Oliver, 2007). A further study is needed to examine how environmental attitudes, awareness, and knowledge are related to teachers' affective development and to assess the impact of environmental education on it. Since the industrial revolution, technological advances have led to a number of problems in scientific and technological fields.

Various developments concerning the quality of life have had negative effects on the ecosystem and led to the extinction of many living organisms. A positive orientation

toward the environment has been measured either by attitude scales in some studies, in both local and national aspects. It is common to mention both emotional and cognitive components of attitudes, in which emotional feelings relate to feelings and a cognitive aspect relates to unaffected facts and beliefs.

Therefore, an attitude is more than simple facts that may be assessed against surveys. Due to the fact that surveys mostly always include measures of demographic characteristics, several papers which have explored, emphasize the correlation of environmental concern surveys. Few studies have indicated that there is a direct correlation diverse environmental belief and a pro-environmental attitude although it can be identified that a significant impact on environmental decisions based on the attitudes of individuals mentioned in this study. The change in attitudes has been directly linked to the change in behavior.

Furthermore, it is noteworthy that, in addition to a broad range of knowledge (awareness of issues, a thorough understanding of action strategies = cognitions), environmental education emphasizes values, ethics, attitudes, and behaviors under pedagogical conditions, making it a unique way of teaching environmental education in a way that is rarely explored in other fields. It is common for games to encourage players to act in ways that contradict their existing attitudes, but are still slightly at odds with the target attitudes.

Yet, using digital games to teach young people pro-environmental behavior in the classroom can, however, be an effective tool for raising their awareness of the environment. Yet, games are not often used in the classroom for two reasons: they are time-consuming, and there are not enough devices to accommodate every student. As an alternative, games foster players' knowledge of sustainability issues

and encourage them to become highly motivated about sustainable development plans.

1.1 Environmental Responsibility through a Philosophic Approach.

Environmental Education towards environmentally responsible behaviors

The aim of Environmental Education (EE) is to facilitate changes in environmental behavior (EETAP, 2002). The "Hines Model of Responsible Environmental Behavior" (Hines et al., 1986/87) along with the "Major and Minor Variables (knowledge of issues; knowledge of action strategies; locus of control; attitudes; verbal commitment; and sense of responsibility), included in Environmentally Responsible Behavior" (Hungerford & Volk, 1990) are often cited as fundamental to understanding influences on citizenship behaviors during the educational process. Individuals were able to act when they were knowledgeable about an issue and had access to the skills necessary to use action strategies for that issue . (Hines et al, 1986). "Those cognitive and personality variables were presented as the main milestones of the intention to act related to the psychological approach of the Theory of Reasoned Action (Ajzen & Fishbein, 1980), is the direct determinant of behavior".

Among the strategic frameworks that address these influences are the Investigating and Evaluating Environmental Issues and Actions (IEEIA) curriculum(Hungerford al., 2003), the Action Research and Community Problem Solving model by Stapp, and the Community Based Environmental Education model by Community Based Environmental Education (CBEE) model (Andrews et al., 2002) promote a behavior change, individual and social growth in environmental analysis and problem-solving which are essential. There is no other way to determine an individual's behavior than

to measure the "frequency, intensity, duration, latency, and perseverance of the action" (Bach & Moran, 2008, p.56) exhibited by any person .

Therefore , these environmental actions, may affect the environment positively or negatively, are the ultimate measures of success in achieving the final goals of Environmental Education.

The main citation : "If behavior is the wind, then action is the observable and measurable sway of the tree." Furthermore, it was realized that the route to the most strategic actions could be a long one in the complicated, personal development of an individual activist .

Students at different institutions and places can develop knowledge, awareness, and confidence with personal decisions over time as a result of the environmental significance of teachers' actions (individual sphere).

The relative constancy of definitions should clearly suggest that environmental education does mean educating "about" basic processes and problems of the environment and "in" the natural environment-when possible and applicable.

Yet, environmental education means educating **"for"** the environment-with strategies that enhance critical thinking, investigation over indoctrination, and collaborative, local, science-based solutions over advocacy. Environmental education, in addition to any other educational endeavor, must ultimately support the social function of transmitting knowledge, skills, attitudes, and behaviors that provide long-term benefit to the individual and community. Educating "for" the environment should, in no manner, It may involve coercing prescribed behaviors that are heavily influenced by individual teacher perspectives, since environmental issues are complex and dynamic.

The goal of environmental education researchers and teacher educators should be to objectively explore those pedagogical methods in Globe Program that are most likely to translate into a citizenry of thoughtful, effective problem-solvers who make significant environmental impacts later in life. "Because a major goal of environmental education is to develop independent, critical thinkers equipped with the knowledge, attitudes, and skills necessary for long-term responsible behaviors, the observable and recordable actions defining those behaviors must be identified if researchers are to assess the outcomes of Environmental Education programs".

Monroe (2003), drawing on and combining the works of Stern (2000) and Winther, Volk, and Hungerford (1994) described the following five outcomes of teaching environmentally responsible behaviors:

1. Environmental activism (e.g., actively participating in or leading environmental initiatives).
2. Non-activist political behaviors (e.g., joining an organization, voting, signing a petition, or writing a check).
3. Consumer behaviors" (e.g., purchasing "green" products, recycling, reducing energy use, and altering consumption habits).
4. Ecosystem behaviors' (e.g., putting up bird boxes, planting sea oats, counting wildlife populations).
5. "Workplace behavior " (e.g., reducing waste in the production process, establishing mortgage criteria for energy efficient houses, suing a polluter, etc.).

Though each of the categories of responsible behaviors might be implemented in various ways and under a variety of circumstances, consumer and ecosystem

behaviors would generally be local, personal sphere behaviors, whereas political activism and non-activist political behaviors would generally be public sphere behaviors with the potential to have broader impacts. Many other environmentally responsible behaviors are displayed in either the private or public sphere.

I believe that environmental attitudes and behaviors help to determine environmental responsibility; therefore, "an effective Environmental Education program must include knowledge, attitudes, and behaviors". Leeming, Dwyer, Porter, and Cobern (1993) reviewed "environmental education research and concluded that behavior change is necessary to preserve environmental quality."

1.2 Process of Environmental Education (E.E) among school Teachers in Philosophic Aspect:

The educational system places special emphasis on environmental education programs targeted since pre-school level as a means of instilling behavioral patterns (developing "green" codes of behavior) towards environmental studies program for high school final examinations. A diverse of academic programs and environmental courses are offered in a diverse range of disciplines. In addition, environmental behavior is being introduced into university campuses. A nationwide student environmental organization, Green Course, was set up since 1997. As a measure of how successful environmental education is, its ability to integrate into other areas or the core of the curriculum demonstrates its success. It is heartening to see that increasingly solid environmental subfields have been established in sociology, economics, sciences, journalism, and so forth.

The value of such infusion reflects the realities of environmental issues. Most environmental issues have ethical implications. In recent years, Sustainable

development has become a growing focus of Environmental Education over the last few years. Actually, the relationship of human being with nature is crucial to his sense of identity, while sustainable development as a policy statement is highly problematic. By combining sustainability with a frame of mind, programs such as Globe Program have the potential to have positive and broad-reaching educational implications. A general model in my research, presents the basic components of environmentally responsible attitude among teachers.

Theses main components are: a) system of knowledge which include knowledge of issues, knowledge of actions strategies = cognitions) in relation to environmental education, and environmental legislation. Values, ethics where there is analysis of the core of environmental issues which lead to an individual self-criticism, and self-control. Environmental activism which starts by acquiring practical skills to improve environmental issues.

All these components lead to purchase ecological self-control and knowledge of values in environmental activism resulted by developing an emotional attitude to nature. This approach provides an innovative perspective not always found in other fields. Yet, students are being taught attitudes and values that promote environmentally responsible behavior that guide policy makers' efforts to instill environmental consciousness in them. In environmental-friendly and environmentally friendly behavior, actions are taken in a way that does not damage the environment and has the smallest negative effect on ecosystem balance as possible."(Stern, 2000).

Some studies have examined pro-environmental behavior by measuring recycling habits, purchasing environmentally adapted products, making investments in energy-saving products, decreasing energy consumption transportation habits and at home

too. In order to influence people's environmental behavior it is firstly needed to identify factors which influence this behavior except for socio-demographic (for example gender and age) and economic factors, knowledge and habits, several psychological factors can also contribute to the prognosis of pro-environmental behavior. The usage of natural resources by one person also impacts the use of those resources by other people, which can be regarded as philanthropic behavior (e.g., Biel & Gärling, 2005). In this case, a conflict exists between what is best for individuals on a short-term basis and what is best for society overall on a long-term perspective (Ojala & Höijer, 2016). Based on these principals, environmental behavior can, to some extent, be placed in the moral authority.

Altruistic and biosphere values, feelings of personal responsibility, and pro-Environmental attitudes may be psychological factors that influence environmental behavior in this field. It is possible to define values as fundamental and stable outlooks on life and the world. Values can be defined as fundamental and stable outlooks on the world and our place in it ". (Rokeach, 1973). According the researcher Rokeach, "As we evaluate both our own behavior and the behavior of those around us, our values serve as guides Our values serve as a guide for evaluating our own behavior and that of others. They can also be important parts of our identity." (Rokeach, 1993).

Due to values' comprehensive nature, they play a significant role in establishing specific attitudes in restricted circumstances. Previous research has found that values of people are significant predictors of their pro-environmental behavior, (Kaiser et al, 1999; Stern, 2010). A positive relationship between altruistic and biosphere orientations and pro-environmental behavior have been suggested." (Stern, 2010;

Stern & Dietz, 1994). In order to benefit other people, people with altruistic values will act in an environmentally friendly manner.

A biosphere-valued individual, however, will act in an environment-friendly manner, benefiting nature and the biosphere accordingly.

There are different opinions about whether biosphere (e.g., Barr et al, 2015) or altruistic values is the best predictor of pro-environmental behavior. It is important to note, however, that both factors influence whether or not people will behave environmentally friendly.

A psychological definition of responsibility could be described as self-chosen restrictions about how to act, partly based on how those actions will affect others. Responsibility can also be shown in rejecting to accept immediate achievement, instead hoping to be rewarded in the long term. Feelings of responsibility regarding environmental matters are connected to personal norms, which can be in the moral domain (Schwartz, in Abrahamse & Steg, 2009). Personal norms can be involved with environmental matters in the moral sense. (Von Borgstede, 2002).

People have their own moral obligations towards other people and/or nature as part of these norms. (Schwartz, in Abrahamse & Steg, 2009). They are also referred to an altruistic way of thinking, where pro-environmental behavior leads to contribute sacrifices to the benefit of others (Clark, Kotchen & Moore, 2003).

When a person feels responsible, these personal norms will probably be activated. In previous research, the feeling of personal responsibility has been shown to influence the use of natural resources by people, as well as how they influence others. The feeling of personal responsibility has been related to individuals' environmental

behavior and their use of natural resources, and it has also been shown that people's influence on the environment has an effect on others as well (Biel & Gärling, 1995). This could lead to a social conflict on a short-term basis as an individual consumer environmentalist, and what is best for the general public in the near future perspective (Ojala & Höijer, 2016).

In this field, some psychological factors that may influence environmental behavior are altruistic and biosphere values, feelings of personal responsibility, and pro-environmental attitudes. "Attitudes can be defined as either positive or negative evaluating reactions, concerning a person, a group, or a phenomenon "(Myers, 2012).

They are expressed through emotions, behavior intentions or convictions. In order to improve people's environmental behavior one popular method is trying to change the attitudes people "shelter" regarding environmental issues. Studies have sometimes revealed that pro-environmental attitudes and behavior do not always interact as well as would be expected.

Just because a person tries to find a habitat by acquiring positive attitudes regarding the environment does not necessarily mean that she or he will behave according to them. Often people need to acquire a pro-environmental behavior suitable for a short term, otherwise they do not feel it is worth their effort. A reduced standard of living is also perceived by some as a consequence of, for example, reduced consumption.

Despite having pro-environmental attitudes and knowing the benefits of a pro-environmental lifestyle, they continue to consume the same amount as before. (Nordlund & Garvill, 2012). However, this is not always the case. Positive attitudes towards the environment are associated with more environmentally friendly

behavior, according to some studies. There has been a variety of results regarding this question in previous research, so it is important to explore further the relationship between pro-environmental attitudes and behavior in this area. Students must be taught to be responsible citizens by their teachers.

Last studies have presented students from public schools to differ regarding feelings of responsibility in accordance to social and moral questions of society. This causes to the question; can this be generalized to their teachers? Teachers are not only a main group due to their commitment to teaching students about the issues mentioned above, but also as active environmentalists.

1.3 Building an environmental responsibility among students.

The goal of Environmental Education (EE) is an achievement of responsible environmental behavior. In the literature, environmental actions that represent responsible environmental behavior (REB) have been divided into a few environmental action categories, also referred to as citizenship skills (Ramsey, Hungerford, & Tomera, 1981; Sia et al., 2005). Ramsey et al., Sia et al., divided REB into five action categories: (a) eco-management, (b) economic action, (c) persuasion, (d) political action, and (e) legal action.

The six categories of environmental actions defined by Smith-Sebasto and Ayres (civil action, educational action, financial action, legal action, physical action, and persuasive action) were used to construct a theoretically defined scale for measuring environmental behavior among school students.

Thus, it is essential to organize the environmental action categories on a scale according to the frequency where students at OFRI Center perform them to reveal their perspective on environmental commitment.

The lowest level of environmental commitment, according to this viewpoint, is resource conservation actions that provide personal financial benefits. The next level of environmental commitment includes actions that present environmentally responsible consumerism. In this category of recycling efforts, products which are related to household items, we are exposed of their awareness to the environment. Furthermore, personal interests play a significant role, which is also the driving force behind the activity. Findings from the Ministry of the Environment present that students perceive recycling activities as a separate category may be one reflection of the environmental agenda in Israel.

Waste recycling is one of the focal points of environmental efforts at a national level, as reflected in legislation, media exposure, and investment in infrastructure (Ministry of the Environment, 2009; Ministry of the Environment, 2016). Recycling also is well considered as a main step in the educational system (Ministry of Education & Culture 2007). Since the awareness of environmental education, the students are relatively well exposed to this environmental subject. The high level of involvement in this behavior category still reflects a strong commitment to environmental protection due to the fact that household waste recycling in Israel is largely voluntary and not supported by tax incentives. Therefore, programs are needed to create awareness about the total human environment, like GLOBE Program which is built to strengthen positive attitudes toward environmental improvement. Yet, there are diverse Environmental Education Programs (EEP) such as field trips, hiking, camps, adventure

activities, emphasize to personal experiences, to develop students' affective relationships to the natural environment, their social relationships and outdoor behavior, as well as their environmental sensitivity. Actually, Environmental Responsibility Behavior is a learned response or action.

Studies indicate that increased motivation into actions are implemented due to high interest, knowledge of environmental actions strategies. Other factors related to taking actions are self-esteem and students' beliefs and values. According to Dewey and modern constructivism, teaching has been based on students' life style. Student learning is best achieved when they learn from problems they encounter in their daily lives and solve them themselves.

There is, however, no educational end to student's own activity. It is important to control what is done and how it is done so that it fits into a systematic overall process. In addition, the teacher must guide the construction processes of knowledge. (Von Wright, 1996). Therefore, knowledge and values play a crucial part in decision-making.

Therefore, knowledge and values play a crucial part in decision-making. Students will be able to build a sense of eagerness and responsibility to act as they gain an understanding of man-nature interactions.

1.4 Environmental Education in the Israeli Education System in High Schools

Environmental studies, at two levels, have been approved for matriculation examinations since 1984 by the Ministry of Israel Education. The basic program introduces principles and foundations of environmental study and allows students to focus on a specific environmental subject in relation to a specific location nearby.

A research program in the environmental studies, known as an "ecotope," includes fieldwork, observation, surveys and a paper. Study of specific environmental issues is assisted by community work, development of environmental values, use of innovative technology and methodology, and an autonomous study. About a third of all Israeli high schools (some 220) offer the matriculation program on the environment. About 5300 high school students conducted environmental projects last year. Environmental Education is developing in a productive and in a practical aspect. There are, however, several major issues that could impact its fundamental objectives. As the case study of education for sustainable development illustrates, one of the most pressing challenges is the incidence of the development ideology.

If environmental education is to be ultimately concerned with people, this must include an objective understanding of how people learn about their environment and how this learning shapes their behavior (101). Recently, all of the country's major universities and colleges have opened graduate or undergraduate level programs in environmental studies and management. Several academic disciplines offer environmental courses, and the academic program is very diverse.

In addition, environmental behavior is being introduced into university campuses.

A nationwide student environmental organization, Green Course, was set up in 1997. The group has members on all major university and college campuses around the country and promotes student awareness and consciousness through outdoors activities, surveys, seminars and field days.

On the other hand, there are some pedagogical problems in Environmental Education in Israel which appear at first stage:

Curriculum Planning in Environmental Education at school. Difficulties which come from the school reality where for most students, many subjects which are taught at school, seem completely separated and insignificant in their daily life. Teachers are busy with social student problems, with their adolescence age, etc.... Teachers and students have a personal agenda of the importance of ecological problems in relation to other problems.

b) In the near environment, at home, at school, the Israeli student is not exposed to significant attempts to maintain and to improve the environmental quality. School is often neglected; the school yard is deserted, and the street is dirty and noisy. There is a lack of environmental models "to imitate ". The Israeli Students suffer from lack of hours to analyze environmental issues, usually in science class only. The problem arises in any discussion of environmental issues in the curriculum.

There is a problem of "translation" of enviro-ethical values into to daily behavior. Each teacher sometimes is faced in front of the problem of evaluating his educational work. Other difficulties raised from Environmental Studies such as knowledge, which is required for environmental processes, is accumulated in diverse fields, so that some of them ensure a deepening process, that is beyond the ability of many students. Moreover, there is a serious disagreement between the researchers about a wide range of environmental issues.

Environmental Phenomenon has received different interpretations, leading to conflicting conclusions. The main problem is that the student discovers that the solutions are very few due to economic or social problems. This can lead to the students to see an irreversible damage and acquiring a feeling of frustration.

Due to this situation, students should participate in diverse ecological workshops or projects, having the skills for positive action on environmental matters. There are several significant changes in the school environment both physical and administrative, in order to build an effective and fruitful program.

A prerequisite to the success of an environmental program is, changing the values in fostering learning environment. Furthermore, the barriers between the different subjects should fall, due to the fact that Environmental Studies is an interdisciplinary subject that enables knowledge and principles from different aspects. Yet the textbook is more flexible and more comprehensive, it will be a great device to present a comprehensive aspect of Environmental Education.

Analysis of current pedagogical problems in Israeli and non-Israeli schools:

Throughout the years, there is a concern that scientists, educators, and the general public about the quality of education in schools through the realization that "... the earth is a definable system, and the future of civilization is threatened by numerous ecological catastrophes" (18,19,21). In order to maintain ecology and quality of life, including the management of natural resources, Brody said that basic science ideas and skills ought to be integrated with real-life concerns.

To become responsible citizens, students must learn that people are an initial part of the biosphere, responding to changes and increasingly causing rapid changes to the environment (16,17,21,25,27). There is no doubt that water is one of the most fundamental concepts that are essential to life on earth and its ecosystems "... is critical to achieving an understanding of the complexity and interrelatedness of earth systems" (16,17).

The project **Water is the essence of life**, is designed to engage participants in investigating specific environmental problems through concrete issues and direct experience, such as studying local streams or rivers to raise questions about the nature, sources, and use of water.

This project enables participants to teach their students to be able to teach their students that water-related problems can be solved by solving them and that successful approach to controversial water-related issues can benefit the community as a whole.

This project enables participants to teach their students to be able to make a difference by helping solve water-related problems and that work on controversial water-related issues can achieve positive results for the community. There are several international projects related to water environmental issues.

A unit of science and global education was designed to enable students to purchase a practical understanding of the environment they live in and the determination to take an appropriate action as responsible global citizens.

Teachers and students participating in the program were encouraged to explore the interconnections among global concerns, including water. Yet, we can't ignore too that also the GLOBE program was developed as a result of cooperation between scientists' teachers, and students and is now part of the environmental curriculum in different countries. Teachers and students all around the world are collecting data about their local communities and sharing it with scientists and students from other countries. Recently since technology has been developed within a short time such as

satellite-based instruments, and other technological advances have adjusted scientists to understand deeply Earth's dynamic natural processes.

Scientists have defined Earth divided into several major spheres: the atmosphere, the hydrosphere, the lithosphere, and the biosphere—are confidentially interconnected by water, chemicals, and energy that are constantly flowing out of one sphere and into the others.

In fact, scientists have investigated more about the changes that can occur inside a sphere as its water, chemicals and energy reserves change. Therefore, scientists have studied Earth system global processes and changes which turned to be a very complex challenge especially a sphere as its reservoirs of water, chemicals, and energy change.

Actually, it is possible to learn at the local level the same basic processes that take place around the world so that students can become familiar with main key concepts of Earth System Science by studying environmental data collected right outside their schools and also through Globe Program. "Water is the essence of life" is a separate unit and plays a critical role in developing teachers' environmental attitudes.

It is important that each country or community develop its own environmental education programs suitable to each country's socio-cultural condition. On the other hand, it is beneficial to consider the experiences of other countries whose environmental education programs have been successful.

Despite the social, cultural, and political differences, scientists and educators from different countries share many commonalities from which many lessons can be learned. Different countries may have similar environmental situations, religious

backgrounds and social-economic problems. Methods and strategies can be adapted, and mistakes can be avoided. In 2005, the Commission of the European Communities published a European Community Program of Policy and Action in Relation to The Environment and Sustainable Development in recognition of the political strength of the international movement to insulate environmental conservation with the EU's efforts to increase economic growth and maintain quality of life.

In the document, the commission recognizes the need to promote environmental information so that the public is aware of the importance of environmental protection and development that is sustainable.

Actually, social climate is tending towards consolidation behind sustainable development. As a result of the current level of attention to environmental issues in Europe, protecting life on the scale of values. Educators are becoming increasingly sensitive and committed to sustainable development. Yet, I can mention that the social climate tends towards consolidation behind sustainable development. The actions that some cities and towns are involved in preparing their own Agenda 21, the efforts of the Federation of Municipalities in European countries and provinces are to increase the beginning of a code of good environmental practices, institutional training programs and work of NGOs supporting sustainable development.

Developing a knowledge of the strong relationship between humans and nature as well as the importance of preserving the natural environment that evolved together with Homo sapiens as one of the primary goals of environmental education in secondary schools. At the college level, students should realize their equality with nature, and develop it entirely and creatively (125,126).

A second goal of environmental education for secondary school is to provide knowledge about ecology and the environment which is necessary for youth to take responsibility for environmental and health issues (123). Specific objectives for the environmental education goal are: (a) to provide an understanding of ecosystems as a whole; (b) to motivate and reinforce positive attitudes concerning the environment; and (c) to develop abilities and skills to analyze interrelationships in nature and to make environmentally friendly decisions when solving environmental problems. Although recent environmental problems in our routine life, many difficulties appear when we deal with these issues through an educational effort. These difficulties can be divided into three main groups: a) Difficulties, which are originated from school reality. b) Difficulties, which are erased from the essence of the educational process. c) Difficulties, which are erased by the subject itself: Environmental Studies.

Curriculum Planning in Environmental Education must be built with awareness and sensitivity to face these problems, otherwise there will not be any achieved targets: awareness to environmental problems and having a personal willingness to act for environmental protection. Here I try to list the various difficulties, facing the planners and the implications as reflected in syllabus, prepared as part of curricula "Human & The nature.": Difficulties which come from the school reality. Environmental Education efforts focused primarily in the education system for all its advantages and limitations. In order to be ready, to face these limitations, it is important to be aware of the difficulties, posed by teachers & educators at school.

1. There is an invisible barrier between the outside world and life in school. For most students, many subjects which are taught at school, seem completely separated and insignificant in their daily life. Emphasis on the concepts and

theoretical dichotomy, the prevailing school of practical reference domain, may obscure the significance studied material, and prevent the possibility of its "translation " to daily activities. Response to this difficulty, curriculum planners of the project "man & the nature " present the various issues in the content, drawn from the students' life. For example: The Unit "Water & Human Being" presents the amounts of water per person consumption, by checking the water bills, the children are asked to bring with them from their homes. Teachers are offered a variety of activities, crossing the "School" and "the world", such as competition and environmental hazards of photographs, newspaper clippings collection, a visit to the Water Purification Institute, making a survey in order to maintain the water supply in our neighborhood (Adam and water, Teacher's Guide 1, 1994).

2. Teachers and students have a personal agenda of the importance of ecological problems in relation to other problems. At the top of the priority ladder for teachers, there are variety of purposes, such as imparting education to their students, development of intellectual skills, fostering inner relationships and learning proper personal development. Teachers may be troubled by the many educational problems: lack of national consciousness, intolerance and lack of self-identity of their students. Environmental Education problem is not always the top concern. Teachers are busy with social student problems, with their adolescence age, etc....
3. When the program "Human & Nature" was taught, the degree of awareness and the willingness to be involved in global environmental problems may be minimal. This situation is an obstacle to try to educate Environmental

Education. In order to overcome this obstacle, curriculum developers become aware of the importance scale of values and awareness of teachers and students alike. This awareness is achieved in various ways such as questionnaires for teachers, discussions on analysis and recommendations to make "public trials" of environmental issues. (Environmental Literacy). In the near environment, at home, at school, it occurs that students are not exposed to significant attempts such as to maintain and to improve the environmental quality. School is often neglected; the school yard is deserted "to imitate". There are no activities and the street are dirty and noisy.

4. There is a lack of environmental models' activities which include operation of composting facilities, organic gardening, adoption of natural and disturbed areas (including polluted streams), cleanups, dispatch of letters and petitions to local authorities, ministers, and environmental organizations, and cooperation with local industries and businesses. Demand to have fun without education is vice may sabotage any educational effort. Learning - effects of this phenomenon is to strengthen the gap between the learning and action, between talking or accepting personal responsibility for a daily environmental behavior / attitude.
5. Environmental problems are a sort of "no man's land" between the Science, Geography and Civics. The Israeli Students suffer from lack of hours to analyze environmental issues, usually in science class only. In this way the student is not revealed to the full scope of the problem and get an overall picture of the various factors that effect on his physical and biotic environment.

Difficulties from the essence of the Educational Process:

Any attempt to educate the main teacher leads him to face an ethical problem or socio-economic problem.

1. There is always a right to educate for socio-environmental values: To what extent can the educator and teacher to intervene in formulating a value system designed by their students. The problem arises in any discussion of environmental issues in the curriculum. About far-reaching significance of the future -a person accepts the conclusion is inevitable, because no society can afford to give up any environmental ethical values of maintaining and fostering resources and environment. Considering this approach, it is obvious that to Environmental Education will be used not only to be a title in a book chapter- but should be a guided principal, implemented in our behavior in public.

2. Every student who cares for the environment should recognize ecological processes, should be able to conceive solutions, on practical experience and on the development of various communication skills within. There is a problem of "translation" of enviro-ethical values into to daily behavior. Behavior, which is based on Ethical values originated from awareness into environmental problems, requires "translation" of principles into meaningful actions. How to develop these skills?

Vacuum and Cohen (1965) explain the difficulty of "translation" ethical principles into significant active principles. They have emphasized the need to foster intellectual capacity to face problems and suggest practicing educational principles into active situations from our daily life. This is the way which students can develop the ability of making ethical decisions. Therefore, Curriculum Planners have adopted this way in

their project "Human & Nature ", where the learner is ought to determine environmental principles, which may apply to different life circumstances and implication of them for personal behavior.

3. Each teacher sometimes is faced in front of the problem of evaluating his educational work. On a far-reaching subject like environmental education, the teacher should emphasize his evaluation test, not only focused on understanding of concepts and principles in this field but also will give fruit in a significant change in behavior outside the school in the long term. Yet, it is difficult to assess changes in attitudes, approaches and actions.

Nevertheless, the Curriculum Planners set themselves a target to accompany the educational effort, spent on "Human & Nature", following the questions: To what extent learners are able to translate "the language" syllabus into deeds and to what extent will they fulfill their lives a concern for saving the environment.

1.5 Difficulties raised from Environmental Studies:

Environmental problems are the most scientifically complex. Knowledge, which is required for environmental processes, is accumulated in diverse fields, so that some of them ensure a deepening process, that is beyond the ability of many students. This can be resulted in explaining the environmental issues, lack of scientific validity and even an overloaded information, and teachers confuse the science. Moreover, there is a serious disagreement between the researchers about a wide range of environmental issues. Environmental Phenomenon has received different interpretations, leading to conflicting conclusions. In order to cope with these difficulties, students are given the opportunity to experience the sense of professional skills to solve an environmental issue. Moreover, Outdoor activities isolated, short,

little science learning is taught. On the other hand, teachers are more comfortable teaching through print, multimedia or in-built settings. In my research, participants who completed Environmental Course Curriculum:

Water is the essence of life, based their arguments on concepts in data interpretation, they purchased within their studies.

Both participants, gain a scientifically meaningful data and had to implement their analyze on what they have already learnt. Water is the essence of life has provided them facts or opinions about environmental issues and has enhanced each individual's problem-solving and decision-making skills. This is the main step in Environmental Literacy. Another problem in Environmental Studies is the study of ecological issues, recognized as serious problems, are the result of human intervention in his environment.

The main problem is that the student discovers that the solutions are very few due to economic or social problems. This can lead to the students to see an irreversible damage and acquiring a feeling of frustration. Therefore, most Environmental Studies Curriculum don't prepare students for controversy. Due to this situation, teachers should participate in diverse ecological workshops or projects, having the skills for positive action on environmental matters. Man is an organism with a great adaptability in various environmental conditions. Teachers, who come from a busy life city, surrounded by serious environmental pollution are crowded, but are not always conscious and aware of this severe situation. Noise is not a disturbing factor for them, and any significant environmental damage is not perceived by them with all severity. We still don't maintain a consistent reference about environmental values.

However, we must be aware to accept the reality although undermined attempts to improve the environment. Under these circumstances, the curriculum planners should plan many educational opportunities to emphasize severe environmental problems. Touring along the river for both selected participants from two groups, is an important component in the unit "Hydrology ", was intended to serve this purpose. During the tour, both participants have used quantitative criteria for determining water quality in practice and have applied the learned material in the laboratory. However, they have experienced a strong emotional and experience of shock and disgust from the water, contaminated human hand. With this experience and others attempts, planners are trying to foster student awareness about the quality of their environment. There is no doubt that the planners of Environmental Studies, are facing particularly difficult challenges in three areas:

1. The essence of the educational process at each institution / pedagogic center.
2. The different teaching strategies used for this discipline.
3. School Reality in each country. There are several significant changes in the school environment both physical and administrative, in order to build an effective and fruitful program. A prerequisite to the success of an environmental program is, changing the values in fostering learning environment.

Many teachers need to receive a pre-service training in Environmental Education, have fewer than three in-service courses Furthermore, the barriers between the different subjects should fall, due to the fact that Environmental Studies is an interdisciplinary subject that enables knowledge and principles from different aspects. Yet the textbook is more flexible and more comprehensive, it will be a great device to present a comprehensive aspect of Environmental Education.

Other Obstacles in creating the desired behavior change:

There are two main centers, who are opposed to behavioral change, creating the desired environmental identity. One of these sources that enjoy the irresponsible behavior of economic consumption - and guidance to the many governments and corporations, enjoy using high amounts of wood, minerals and oil. Countries and corporations encourage this high consumption. The second and main source, is the refuse to accept any change by the people themselves. Old people, who were brought up to the old method of consumption, cited: "It is not comfortable to us. "or" We can't change our daily habit." People feel ignorance and fear, so that they do not know what they must do to change their behavior.

They think that there is always someone who will already take care of any technology invented to solve their problem. People who are requested to change their behavior towards their environment, have found themselves in a socio – economic dilemma. They feel uncomfortable with the knowledge; they must reduce or to save waste disposal. (Oskamp 2002).

To cope with this dilemma, which is an ethical dilemma, they must undergo a process of environmental literacy and environmental identity and responsibility or even to reach the level of developing an environmental leadership.

Some 100 intermediate schools are taking part in a special project entitled “**Future Generation for Industrial High-Tech**” which is implemented by the Ministry of Education in cooperation with the manufacturers Association of Israel. The project, which encourages students to opt for scientific and technological professions, exposes students to the world of high-tech and pairs individual schools with an “adopting”

industrial plant in their vicinity. During the 2019-2020 school year, the educational program focused on “Clean Industry for Sustainable Development.” During the year, students investigated environmental problems and studied the different ways in which industrial plants tackle these problems. A unique highlight of the program was the design of a series of stamps on the subject “The Environment in my Industrial Plant.” Winning designs were sent to a national competition which took place in May 2019.

1.6 SEMEP Project: (South Eastern Mediterranean Environmental Project).

SEMEP is an interdisciplinary project of Environmental Education from UNESCO regarding the Mediterranean area. Through this educational network, schools from the Mediterranean Sea can cooperate internationally.

It promotes a holistic approach to education inside present curricula. Through the identification of issues and the ability to formulate solutions, through practical experience and through the development of different communication skills between and within countries, this approach is grounded in the identification of issues, problem solving and ability to conceive of solutions.

This interdisciplinary project provides an opportunity for the students to construct their own knowledge through the combination of distance learning and the face-to-face teaching.

These diverse projects can be considered a life study program in EE, in that it carries all disciplines within its boundaries. I believe it is a natural venue for program integration and an applied pathway to learning. The aim of an environmental education program is to integrate cognitive and socio-behavioral goals - increased

awareness, responsibility, and engagement that come from accumulating knowledge from multiple disciplines. In addition to developing independent thinking and study, these projects contribute to the improvement of the environment and the development of independence, while undertaking concrete steps to improve his environment. Yet, it is important to make environmental education a part of our lives. If education is encouraged, citizens will understand and take on their role as stewards of this Earth" (20).

1.7 Overview of Environmental Education and Environmental Awareness Through Projects:

Determining and comparing environmental attitudes has been a component of the joint water-related environmental education curricula for Israeli teachers and non-Israeli teachers. Actually, being exposed to the environmental curriculum during the course provides them the opportunity to take scientifically valid measurements in the fields of atmosphere, hydrology, soils, and land cover/ phenology – depending upon their local curricula. But the common aspect of the fields study is based on hydrology field: the joint water-related environmental issues curriculum: "Water is the essence of life.

Furthermore, it was desired to encourage responsible stewardship among the participants. The purpose of this study was to compare, in general, Israeli and non-Israeli teachers' attitudes about environmental issues, especially about water resources in each country. A review of the literature pertinent to this study reflects the limited time that teachers' attitudes about the environment have been studied in Israel. Most studies have assessed the levels of concern that adults in Israel have about environmental problems, although a few investigations have dealt with students. An

examination of environmental education in each country, centering on the introduction of ecological education into the educational system through curriculum development.

For decades, environmental issues were not in a high priority in Israel. Throughout the country, survival questions dominated the discussion. The desire for development was all enveloping. Today, it is acknowledged that a state cannot be built on the infrastructure of destruction, but on environmental awareness, which is prerequisite for environmental improvement. Therefore, Environmental education became even more crucial with diverse global problems, such as climate change, greenhouse effect. The awareness of environmental issues must be raised on local, regional, and global levels, and behavior must be altered to ensure wise environmental management.

Environmental awareness made its utmost in the past, for the protection of wildflowers campaign but recently, there is a concern about environmental issues resulted by increased activism through governmental and non- governmental organizations. (81,82).

Environmental Studies is an essential component in the environmental program which foster the environmental awareness of both the general public and decision makers, to make teachers aware of their responsibilities and concerns regarding the environment and to arouse their willingness and abilities to enhance the environment. Using the philosophy of the researcher Goffin, (1999), one can gain a global understanding of environmental realities by analyzing its components and relationships as an eco-socio-system and therefore making informed decisions.

Understanding one 's environment, its diversity, its richness, and its complexity; and defining one 's niche within the global ecosystem and filling it properly are all involved in this process. Environmental Education fosters a systemic perspective by instilling in students a sense of connection between people and their environments, past and present, as well as lifestyles, health, and wealth. The Environmental Education field is undergoing a constructive development. There are, however, major challenges facing the organization that could compromise its basic objectives. The main challenge facing today's education for sustainable development proposal is the dominance of the development ideology.

It is essential to understand how people learn about their environment and how this learning shapes their behavior if environmental education is to ultimately concern people. (101). In the view of Rejewski, educators should understand how children become familiar with the natural world, including the ecological systems that sustain life. Environmental education must coordinate knowledge about the environment with an understanding of how the child's knowledge of the environment changes, grows, and is amended by experience. The following studies correlate environmental concern with the variables of age, sex, race, and location. Blum (1987) compared five surveys conducted in the United States, England, and Israel on the environmental knowledge and beliefs of 9th- and 10th-grade students.

Although each of the countries surveyed is situated on a different continent, environmental issues were similar. The main sources of knowledge in each case were mass media radio, television, and the press, with school a less common source of environmental information. Despite similar factual and conceptual knowledge levels

among students, Blum found that they differed somewhat from the panel of environmentalists the study was based on.

The students' low levels of knowledge indicate that schools have much to do to improve the knowledge base of environmental issues. To assess levels of environmental knowledge, awareness, and concern, Hausbeck, Milbrath, and Enright (2001) studied 11th-grade students in New York State. Independent variables included type of school, region, and sex of the students.

Research shows that 11th-grade students in public and city schools are less knowledgeable about the environment than those in private schools; however, they are more concerned and aware of it than those who are not. As a result of the study, students believed that a healthy environment is important to their future, that they want to learn more about the environment, and that they can improve the environment on their own.

A study conducted by Sheppard (1995) examined the Black-White environmental concern gap in the United States. Using two opposing paradigms to compare differences in environmental world views: the dominant social paradigm and the new environmental paradigm, this study investigates the differences in environmental world views. As a result of the dominant social paradigm, nature is viewed as a mechanistic system of exploitation, like the traditional Western world view. The New Environmental Paradigm, developed as a result of the environmental movement, a harmonious and stewardship attitude toward nature. The results indicate that there is a difference between African Americans and Whites regarding environmental issues, despite Whites not consistently being more pro-environment. African Americans' environmental concerns may be less than the differences, which are a

result of a complex set of issues they face. While some of the ideas in the New Environmental Paradigm are shared by African Americans and Whites, neither group supports it in a sweeping manner. (43,44).

Newhouse (2000) studied the implications of attitude and behavior research for environmental conservation. Environmental education that can negatively impact positive environmental attitudes is cautioned against by Newhouse (85).

He mentioned that "an internal locus of control, a strong sense of responsibility, knowledge of the issues and strategies, and a positive attitude are among the factors shown to positively influence environmentally responsible behavior".

Yet, implications for a successful educational program contain a program which is appropriate for the level of knowledge, attitudes, and moral development of the individual. Information is a main component of any environmental program and should include how ecosystems naturally function and the well-being of all life. In order to encourage direct contact with the natural environment and to foster a sense of responsibility, action strategies must encourage people to engage directly with nature. Stevenson (1999) has questioned the traditional scientific curriculum model of research, development, and diffusion as it pertains to environmental education. He argues that teachers and students might be able to address empirical questions involved in environmental policy issues with the factual knowledge emphasized in a traditional scientific curriculum model. There are, however, also values and definitions associated with environmental issues. Teachers and students can benefit from environmental education if it promotes values and actions that have been determined to be environmentally and educationally appropriate by external authorities, the traditional model will suffice.

Stevenson (1999) suggests environmental education should be viewed as a way for teachers and students to acquire not only technical information about environmental issues, but to reflect on and also to analyze and to discuss how they interpret them as well as what they mean from a moral and ethical perspective.

Previous research has been shown that environmental education programs in which young people are solely given information are not effective at changing their attitudes towards environmental issues.

Keen (2001) examined the impact of an earth education program on ecological knowledge and environmental attitudes. (57). The results showed that participants in the program did not have more positive attitudes toward the environment as a result of participating in the program, although the participants increased their ecological knowledge significantly. The existing research establishes the fact that young people are concerned about environmental issues and that their concerns, or levels of concern, correlate with many variables, including sex, age, race, and location.

The research also affirms the need for a change from the traditional model of instruction, which is based on issue awareness, to a model that includes student interpretations of environmental issues. An examination of previous studies reveals that more research is needed in the area of student environmental attitudes in an attempt to determine why students perceive certain environmental issues as problems, thereby reflecting the way which they view their own situations.

Environmental Responsibility Strategies for Educators:

Global ecosystems are under increasing stress, and we are witnessing the degradation of the systems upon which humans depend for survival. Both the causes and effects

of this degradation are complex. Whereas some of these changes are due to the natural ebb and flow of natural systems, others are due to the impacts of human behavior. If we are to be successful in the mitigation of these impacts, we must understand the extent of human impacts and how to change them. A key to changing our impacts on global ecosystems is, understanding the effect we are having the effect we are having on them. We, as, individuals, need to understand how our actions affect natural ecosystems and how best to mitigate those effects where they are negative. We do and will continue to need to be able to find balanced solutions that reflect a holistic understanding of the issue we face. Significant to understanding is education. Therefore, we must be certain that environmental education (EE) is not only what it is intended, but also that this field have a significant and lasting effect on behaviors affecting the environment.

The goal of environmental education (EE) should be to help us learn more about how the ecological systems of the planet work (both in part and as part of a whole). We need to understand that global resources are not limitless and global systems are not able to accommodate all stresses. There is a point at which we can place more stress on ecological systems than they can tolerate. Through Environmental Education; we learn how natural global systems work. Education leads to choose. Environmental education helps us to understand the costs and the benefits of our decisions and actions and the relationships between global environmental events and our own actions. (7). Likewise, with the development of high-performance computing and communications, new media is being created, such as the World Wide Web and virtual reality so that this innovative media indicates new types of messages , experiences and pedagogy entitled by international projects provide the opportunity for

traditional distance education to be transformed into an alternative instructional paradigm distributed learning that replicates traditional classroom instruction across distance and time barriers. Increasing public awareness about the environment and improving decision-making processes is an essential component of environmental studies.

We hope to instill a sense of responsibility, concern for the environment, and encourage them to be willing and able to contribute to environmental enhancement. (13). Environmental Education may mean different things to different people.

Our ability to perceive, act, and learn across time and distance is actually being enhanced by regional, national, and global information infrastructures. To some it may suggest ecology or environmental science, while for others it may mean outdoor education or issue instruction. Common to all these approaches, though, is the goal of changing attitudes and behaviors. A rapidly changing world requires EE to prepare individuals to be adapted while offering them the skills to play an effective role in the maintenance and improvement of the environment.

Many of the ecological crises occurring are complex and not easily understood. While the media offers some education regarding current environmental concerns, it tends to focus on the controversial aspects of them. To understand the process and various aspects of events such as climate change.

We need formal, effective programs that help us to understand the complex forces at work and our connection to them. (34). Although the need for EE is significant and the resources invested in it are considerable, not all programs necessarily achieve what they are intended to.

In many cases, it is neither clear what the goals of EE programs are nor whether or not the stated (or intended) goals of EE programs being met. It is widely recognized today that improving the environment requires environmental awareness and understanding. It is imperative that people are educated on the environment so they can develop a sustainable development strategy and handle problems related to the environment and development in a more efficient manner. This is the reason why, that informal as well as formal EE are vital to changing people's attitudes towards sustainable development in order to help them gain access to it and address it.

It is generally recognized that effective science teaching requires teachers to understand the nature of science. It is also vital to understand the relationship between science and environmental education since science can support the study of causes of environmental problems, as well as understanding the complex nature of ecological systems.

Such knowledge is complex, interrelated and may encroach on several disciplines. Therefore, Environment cognition is defined by Gorodetsky & Keiny as a concept that deals with social-economic problems in the context of complexity, dynamism, interaction, and involvement. This has as its goal integrative thinking (Miller, 1981), which draws on meaningful approaches to science (Gaskell, 1992; Watts) and the personalization and politicization of science (Hodson, 1994).

It may be impossible for environmental education to prevail as a cross-curricular theme given the extensive knowledge-centered and assessment-driven content demand of core science and other disciplines. There are a variety of opinions regarding how the "subject" should be taught in schools, with some considering it a part of science whereas others consider it biology and ecology. To others, it includes the

social and political issues surrounding environmental issues. Others feel that E.E. should be used to support for environmental protection.

Nearly everyone agrees that E.E is multi-disciplinary. (36,38,52,54). Currently, some environmental education is incorporated into Israeli curriculum standards. It is generally required that students learn about environmental issues, including pollution, endangered species, conservation, and land use, as part of their education requirements. A better understanding of environmental literacy is seen as essential for decision-making by the Ministry of Education, enabling "the translation of environmental awareness into action." The goal is to create a population that is environmentally aware and demands responsible environmental behavior from all sectors of society. The question which is always raised "How and What should ecology be taught within environmental education? "

In order to develop environmental citizenship, there are five overlapping components required : Ecological Literacy (Understanding the characteristics of key ecological systems through sound ecological reasoning, as well as the nature of ecological science and its impact on society).Civics Literacy (Applying critical thinking to understand key aspects of society, economy, culture, and politics) , Values Awareness (Being aware and acquire knowledge of personal values in light of the environment and a commitment to making decisions and acting with wisdom), Self-Efficacy (Having the ability to learn and act in accordance with personal values and interests as they relate to the environment .),practical Wisdom (Understanding and applying practical skills and knowledge in making decisions and acting with respect to preserve the environment).

These components are highly interrelated and overlapping, which create the main framework for Environmental Responsibility In teachers and students. Even so, environmental knowledge shouldn't be seen as a separate dimension of environmental citizenship, but rather as a component of civics and ecological literacy, so that we can't ignore the knowledge of environmental issues and problems.

In spite of these components, the second question which is raised "What kind of teaching strategies or pedagogy, do we think will be needed to foster ecological literacy within environmental education, so that in order to determine environmental responsibility, students will develop attitudes and behaviors related to the environment through an impressive and active Environmental Education Project?

Ecological literacy is characterized by explicit pedagogy of reflection and thinking, which is an important advantage. There are a variety of activities that can be added to inquiry-based teaching to enhance thinking-systems, spatial, temporal and quantitative engagement. A teacher can develop strategies to help learners develop a stronger and more accurate understanding of a subject matter by using research on learning and cognition in ecology that identifies basic patterns of student thinking, as well as embedded assessments during instruction that reveal specific mental constructs and conceptions held by students.

Implementing these stages will foster the student towards environmental responsibility: engagement and motivation, knowledge and understanding, performance and action, reflection and critique, judgment and design, commitment and identification. (Alan R. Berkowitz et al, 2005).

1.8 Environmental Education in African Countries

There is a great deal of diversity among African educators not only in how environmental education is applied and how it is practiced but, in the philosophy, the regulatory framework, and the operational mechanisms of the educational systems in general in the various African countries. Based on this assumption, it was considered that this special issue of Sustainability on the status of Environmental Education (EE) in African countries would be a useful insight for educators as well as analysts (80,81,82). Different approaches to implementing Environmental Education (EE) have been reported in various countries, both in formal and non-formal education systems.

Formally, EE is either a separate subject, which is interdisciplinary, or a multidisciplinary course that incorporates other disciplines. There are also countries that report the existence of Environment Clubs (e.g., Ghana, Kenya) and Educational Environment Centers that operate directly under the Ministry of Education's supervision and responsibilities.

EE components may be incorporated in other formations (i.e., in the tourist studies etc.). A number of cases highlight the importance of media, as well as the possibilities of using the internet to deliver Environmental Education (EE). (80).

In this context, as a whole, Ghana's emerging curriculum brings together the present study on African cultures associated with EE and science education, which is the main domain of the current study. Actually, there is a synergy content between EE and science education in Ghana, which is regarded to be more developed comparing to African countries. A major goal of the Ghanaian curriculum is to establish new collaborative strategies to revitalize and renew cultural and environmental commons between teachers and students. Economic marginalized countries like Ghana, which

was initially colonized by the British, are affected by Western countries, resulting in an outstanding detachment between science and students' lives, influencing the number of students who choose to pursue science careers. (Entsua-Mensah, 2004).

Consequently, Ghana's local environmental problems are investigated by experts from other countries. Furthermore, it is not the responsibility of Ghanaian citizens to participate in ecological decisions that will ensure the sustainability of natural resources for the next generations.

Moreover, monocultures and terminal seeds are also a cause for concern in Ghana, as they force farmers to buy seeds rather than save them. Nevertheless, there is a movement in Africa that can mediate the consequences of previous Euro-Western colonization within cultural and social contexts. (Entsua-Mensah, 2001, 2004; Jegede, 1995, 1997; Kroma, 1995). Identifying the value of original knowledge in environmental education curricula that support student identity is an essential part of the project and that at the same time endorse natural sciences as a means of making everyday decisions and advocating for affected parties and the Earth.

These proponents of scientific literacy recognize the need for a new perspective: Environmental literacy is essentially reciprocal with scientific literacy. Ecological relationships, which strengthen local communities and ecosystems, are shared by these communities. Jegede (2005) pointed out that “some mistakenly think that to be educated means to be literate,” and he offered examples of African villagers whose communication is exclusively oral and yet are regarded as highly educated (p. 169).

Economically marginalized societies have a long history of understanding the environment, and although it has become increasingly important, the knowledge of people in these societies is often characterized as being backwards or inferior.

It is remarkable how many people considered illiterate in Western terms are quite literate in environmental management and scientific understandings. In Ghana today, for example, a fisheries scientist who focuses on traditional fishing practices provided numerous examples of aboriginal or traditional management practices of water resources and fisheries that continue to be effective. (Entsua-Mensah, 2011).

On the other hand, Students' life spaces and ways of knowing are embraced and valued through the curriculum in West Africa. The curriculum for science is designed to foster student engagement and give students the ability to make decisions while exploring natural phenomena. By cultivating cultural and environmental relations (i.e., ecological relations), it helps create a deeper sense of relationship with and appreciation for nature. Curriculums in Ghana emphasize that schools should adopt European curriculums because they offer multiple ways of learning in the sciences, where the main focus is on ecojustice ethics and efforts to shift EE to the fore.

What one learns from African (and more specifically Ghanaian) science curricular reform movements has major implications for preparing environmental and science educators, curriculum developers, and researchers. Compared with the standard of knowing and living outside of tiny pockets of modern society, some critics claim that these cultural ways of doing things have become antiquated in the modern world.

However, each chapter of the West African EE and science education curriculum emphasizes environmental problems such as air pollution facing local communities.

As a result of people's lives in economic conditions especially people living in economically marginalized countries are often confronted with constant environmental problems, which are difficult and oppressive to resolve. Despite that, the loss of aboriginal knowledge and skills is taken very seriously.

Rather than importing goods from developed nations, local production of goods is being reinstituted, requiring the embrace and valuation of several traditional technologies whose economic value has deteriorated or have not been given much respect historically. (Anamuah-Mensah et al., 2015).

For example, the Ghanaian curriculum emphasizes about a substantial number of aboriginal industries using dependable ancestral technologies are still in villages and in large urban areas: "In the current knowledge economy, these technologies can continue to exist if they are improved upon and made competitive to those of developed countries through the application of science and technology" (p. 27). Interestingly to mention, the development of scientific and industrial research organizations in Ghana is leading to the improvement and increase of the visibility of the aboriginal knowledge. A higher value was placed on ancestral technologies (with few exceptions) that are less ecologically damaging that leave a smaller ecological footprint, these organizations emphasize the symbiotic relationship between traditional cultures and ecosystems.

Currently, there are efforts underway to develop African curriculums that confront cultural attitudes towards indigenous knowledge and skills through science and EE. To engage students in their cultures, communities, and ecosystems, ecojustice is a critical part of the project. By identifying vulnerabilities, it protects ecosystems from

restrictive ideologies and threats, while bringing them into contact with functional systems.

Yet, it is necessary to mention that environmental justice and place-based education don't often compatible with standards-based educational reform. Researchers can, however, shed light on short- and long-term outcomes of educational reforms incorporating environmental justice ethics, such as those used in Ghana's curriculum.

Furthermore, researchers may examine whether this pedagogy promotes a student's sense of identity and affect, their ability to construct science knowledge, and how much critical thinking occurs in the classroom with this approach. As a result of ecojustice ethics impact, it enables to eliminate the notion that such countries are inferior or underdeveloped in their perception and development processes.

In some aspects, the Ghanaian curriculum is more progressive so that it decreases additive vulnerabilities and damages of Earth's ecosystems comparing to other curricula.

However, the African curriculum represents a developed curriculum, a synergy of engineering and science education at all levels that has already been studied in the literature , and geographic specific narratives as part of the foundation for participation in the competence of communities and ecosystems (community and ecosystem competence is based on relocating community knowledge, skills, values, beliefs, expectations, and specific narratives as part of the foundation for relocating community knowledge, skills, values and beliefs. There may still be some science educators in colleges of education who resist this emerging synergy, especially when it comes to the acceptance of EE practices and the incorporation of spirituality, beliefs,

and values into a synergistic science curriculum. The study of culture scholars is increasingly examining examples of synergy that are difficult to ignore.

In a recent article, Prakash and Stuchul (2014) discussed issues associated with education and globalization in relation to achieving ecojustice. Traditional knowledge and skills are being recognized by scientists and environmental educators in Ghana, Kenya, and Malawi, replacing generalized textbooks. Education might break the Western cavity of alleged development by proposing alternatives to globalization and industrialization and reconstructing the commons through learning and living practices. (Entsua-Mensah, 2004, 2012; Glasson, Frykholm, Mhango, & Phiri, 2006; Tippins, Handa, Bilbao, & Morano, 2014).

Many of those works emphasize local people's community-centered skills and knowledge as they relate to diverse geographic places and the processes of reconstruction of understanding.

Taking this step encourages educators in the local community to share responsibility for what happens at their schools as a result of being immersed in the local culture, community, and ecosystem.

Therefore, I can conclude that examples from some African countries such as Ghana which is an economically marginalized nation, promotes science and technology to face environmental problems while maintaining the importance of place-centered narratives, local peoples' knowledges and skills, beliefs and values, and personal and shared expectations.

The EE curriculum emphasizes the change of attitudes towards the environment by teachers, environmental decision making is facilitated by students who have a greater

understanding of their natural environments. Furthermore, their cultures, communities, and ecosystems are also under threat from national tensions and economic problems, which may burden and threaten their local cultures, communities, ecosystems, political issues such as national tensions. Encl.: 1: An example of EE in the primary school curricula in several African countries: “Water & Sustainability” subject in Primary School Curricula:

Table 1 Water & Sustainability” subject in Primary School Curricula

CLASS	LESSON	UNIT NO. + TITLE	SUBTITLES CONCERNING “WATER”
1st grade	ECOLOGY	7 Living in a health Environment. 9 We are surrounded by living things.	“Contaminated Water”. “How much water is needed to plant growth? ”.
2nd grade	ECOLOGY	4 Growing up in a health Environment. 9 We are surrounded by living things.	“Environmental Health issues” “Too Much Rain in my environment”. “Can Pesticides protect Plants and Animals? ”
3rd grade	LIFE STUDIES	3 Sensible uses of resources 4 Where We Live 6 Growing up in a health Environment. 7 We are surrounded by living things. 11 Energy Force and Motion	“Protecting Natural Beauty Places” is an important component of "Energy, Water, Fuel & Gas Sensible Use"". “Air, water, and food are necessary for all living things.” The Relationship Between Motion & Energy- Energy from Water”
4th grade	SCIENCE	1 Nature of Substances and Energy 2 Knowing and understanding our Surroundings	“Acid rain effect our natural resource." and How Water is Affected by Pollution” “Producing Energy from Water”
5th grade	Ecology	The interaction between living things and the natural environment.	“The Effect of Pollution on Health”
6th grade	SCIENCE	1 An exploration of living things' internal structures	“Environments in which Plants Live" "Plants Living in Different Environments"

7th grade	SCIENCE	4 The Home that We Share with All Living Creatures: Lets Understand and Protect Our Planet	"The impact of eco-systems on beautiful natural places ". Protecting Water and Water Resources" "Sustainable Development"
8th grade	SCIENCE	2 Substances and Energy for organisms	"The Relationship between Organisms and Energy".
1st to 8th grade	SOCIAL SCIENCES	Our Near Environment Our city, Our Region, Countries, and Continents	"Environmental Issues and Hazards" "Taking Preventive Action and Protecting Yourself".

Major crises are taking place at the human level due to current standards (unemployment, wars, famine,) and environmental distraction (pollution of water, air, and soils, extinction of species).

Simultaneously, global interactions, global economies, global environmental problems are all a part of the era of globality in which human race live.

The importance of environmental education should be put at the top of the educational agenda given that it seems to hold the opportunity of providing an answer to the main crisis. There can be a great deal of impact when something happens in one part of the world and affects something else in another. It is possible that environmental education will bring about broader changes in society and education.

Future citizens may be empowered to take control of their lives and contribute to their prosperity. In order to effectively implement Environmental Education, the specific conditions of the local environment should be taken into consideration. Each challenge demands to be regarded both the specific locality and the specific educational system, so that it will be clearly understood and well located.

Developing and Developed countries' environmental concerns

Many authors have examined and evaluated the attitudes of teachers toward environmental issues. However, few systematic comparative studies on environmental concern and attitudes have been done across cultures and countries. According to Inglehart (1990), a post-materialist shift in cultural values was linked to the shift in Western attitudes toward environmentalism; it was believed that a high standard of living and industrial development were prerequisites for positive attitudes toward the environment.

Therefore, it was accepted that high levels of environmental interest occurred among people in developed countries. Researchers Dunlap and colleagues (1993) conducted an international study on environmental values that challenges this assumption. (1993). The survey's results showed that they have to take for granted. Other multinational studies have found similar results. (Schultz & Zelezny, 1999; Rauwald & Moore, 2002) and studies in the Baltic States (Gooch, 1995), Turkey (Furman, 1998; Yilmaz et al., 2004), Mexico (Corral-Verdugo & Armendariz, 2000), and Zimbabwe (Van Petegem et al., 2007) .While Swedish (Schreiner & Sj, berg, 2005) and English teachers (Jenkins & Pell, 2006) seemed to be somewhat alienated about environmental issues, Zimbabwean (Van Petegem et al., 2007) and Malaysian teachers (Said et al., 2007) maintained much more positive attitudes toward environment. Van Petegem and Blicke (2006) found significant differences in adolescents' perceptions of the human-nature relationship between Belgians and Zimbabweans.

Two groups of students both held an ecological view in which they recognized the negative impact humankind has on nature, however only the Zimbabwean students believed they were entitled to use nature for their own benefit. SariGill (2009)

proposed several hypotheses suggesting that there should be differences in environmentally-oriented attitudes between collectivist cultures in which individuals believe the will of the group determines member's beliefs and behavior" (p.370), and cultures based primarily on individual self-determination, in which individuals believe in their own decision-making strength.

"Past-oriented cultures" that value customs and tradition and "believe that preserving history and nature is important" (p. 371), and "future-oriented cultures (that) give less importance to conserving the nature and the past" (p. 371). A comparative study conducted by Sargali (2009) examined these hypotheses and has found that Turkish people (collectivists and past-oriented) were significantly more distressed over the environmental situation than Canadians (individuals and future-oriented).

As Ignatov (2006) claimed: As an alternative to thinking of environmentalism as a single, unitary worldview associated with some demographic fragment of society, it is important to acknowledge the remarkable widespread concern for the environment that exists today and culturally diverse... Concern for the environment is thus shaped by social conditions within nations. (p. 456).

Researchers have tested or derived evidence for most existing assumptions about environmental attitudes in developed countries. In order to determine how science education at school can promote these attitudes, researchers understood that it is a necessity for studying and comparing teachers' environmental attitudes and interests in developed and developing countries as indicators for environmental behavior. A study on environmental education for sustainability was conducted based on data collected in the ROSE Project. It aims to collect and analyze data from learners about

factors that influence their attitudes towards science and technology (S&T) and their motivation to learn it as part of the Relevance of Science Education research project.

Several examples are: The variety of science and technology (S & T -related out-of-school experiences, their interest in learning different S&T topics, their perceptions of school science, their attitudes and expectations about science, and their feelings of empowerment and their priorities and aspirations correlate with environmental challenges provided by the students.

However, either environmental education or multicultural education cannot ignore diversity as a fundamental value. Cultural diversity is as crucial for humankind as biodiversity is for nature (UNESCO, 2001). Despite the fact that ecological diversity and cultural diversity have common aspects, they are usually examined separately in education, just as the problems that appear from cultural ignorance or environmental neglect. According to Bowers (2013), the codes of moral mutuality are integrated in indigenous knowledge, which provide to constrict human impact on ecosystems. If we lose cultural diversity, we face obstacles which inhibit us at the same time to live in harmony with our ecosystems. Environmental education and multicultural education are both concerned with the sense of belonging, that is, people's connection to their natural and social environments.

In developing countries, Falgout and Levin (1992) claim that knowledge is valued for its application, results, and products, whereas in Western schools it is revered as a virtue to acquire knowledge for its own sake. As long as the local education system remains tied to its original source, the official school view is largely a product of Western culture within developing countries. Science programs, in particular, are often copied directly from western nations' programs without any adaptations.

It is important for curriculum designers to recognize both students and teachers belong to a local culture that continues to cherish certain traditions and practices while undergoing significant change. Yet, curriculum designers tend to ignore the cultural context in which they are supposed to place their curriculum (Waldrip & Taylor, 1999). In EE programs that currently prioritize cognitive development, attention should be paid to affective and sociocultural development if they are to motivate environmental stewardship in the long term. The research community may help facilitate these advancements by studying and refining educational tools aimed at improving the connection between humans and nature on an affective and social level. Furthermore, future research is essential to understanding how affective, sociocultural, and cognitive aspects of EE can have an impact on the outcomes of teachers and students.

Another important point to take care into consideration is diversity among the participants. Diversity as a value is fundamental in both environmental education and multicultural education. Cultural diversity is as crucial for humankind as biodiversity is for nature (UNESCO, 2001). Diversity of ecological and cultural types constitutes a single phenomenon, but it is primarily discussed separately in education. Environmental degradation and cultural ignorance are problems arising from cultural ignorance. Culture diversity undermines a sense of belonging, in other words, people's sense of connection to their natural and social environments, which is an integral component of environmental education as well as multicultural education.

According to Nordberg-Hodge and Goering (1995), it is recommended that for sustainable future societies to be built, the new environmental paradigm requires a sense of community. It is the principle of multicultural education that no one should

be left out of society, so it is extremely important to feel accepted, respected and a part of the community. Smith and Williams (1999) had argued that environmental education tends to overlook the ties between particular biosystems and cultures. Human beings' embeddedness and belonging to natural systems should be emphasized in environmental education according to their suggestion. Ecologists argue that there has been a disruption in the relationship humans once had with the natural world, and suggest that ecological education might help and is a main tool to restore this relationship. Through engaging and intriguing cultural traditions and ecology, they hope to create an ethic rooted in an understanding of mutual dependence. However, education should be directly linked to the ecological and social well-being of the places where people actually live and enable to promote their environment. The integrity of the environment and our survival as species rely on people empathizing with one another and extending compassion to people from other lands, to other species, and to future generations. It's important to mention when the term place-based pedagogy is used. It includes both environmental education and multicultural education, as well as indigenous and democratic education. Empathy can be evoked more easily when we form a personal connection with our environment. Furthermore, compassion is necessary for reaching multicultural education's major goal: the elimination of racism on both the individual and institutional level.

1.9 Cultural practices and STEM education in sustainable environmental practices.

A major goal of education is to prepare responsible citizens to understand their society's problems and to act accordingly to help solve them. A good education can foster such behaviors by imparting expert knowledge about social issues, cultivating

critical thinking skills, and teaching pro-active problem-solving skills. It is essential for people to know and understand their local environment, listen to others and live-in harmony with it in order to achieve cultural and local sustainability.

Promoting sustainable environmental practices in communities requires a multidisciplinary approach that combines STEM (Science, Technology, Engineering, and Mathematics) with cultural methods to engage and educate people and their relationship with culture variables. Furthermore, it is equally important to protect and preserve a healthy social and cultural community when attempting to create a sustainable future. It is crucial to clarify the vision of the future for environmental education, which is based on understanding sustainability and its dimensions. (McKeown & Hopkins, 2013; Tilbury & Henderson, 2018). Schools and societies with multiculturalism may have difficulty achieving environmental education's objectives.

In the long run, it would be interesting in reorienting education to better meet the requirements of a sustainable society by further developing environmental education.

A multicultural approach to analyze environmental education is only the beginning of a line of work that could lead to more holistic approaches to environmental education that cater to sustainable practices on all levels. Nowadays, environmental studies are part of Science and Technology Studies, and they cover a broad range of scientific topics, as well as economic, social, and ethical concerns.

A quarter of the defined goals in both curricula relate to human activities effects on the environment. Environmental problems result from environmental practices, which in turn are cultural activities (Castells, 2017; Saul, 2011). It is inevitable that

both the environment and culture will change over time. Because neither culture nor the environment are static, people transform their environments and cultures as well.

The study conducted by Whitburn, J., Linklater, W. L., & Milfont, T. L (2018) on the effects of ethnic and cultural background on environmental awareness, attitudes and willingness to act with a high responsibility towards the environment among high school and teacher-training students is a valuable contribution to the field of environmental education research.

However, there is any comprehensive and significant study about EE in teacher – training programs in Israel. Yet, it is essential to evaluate the existing programs and to characterize the environmental literacy level of teacher-training students at different stages of their training. Social and cultural environments are as equally important as natural environments for human beings. The proposal put forth by Kymlicka (2016) regarding the contribution of multiculturalism to environmental education (EE) is indeed interesting.

Kymlicka emphasizes that multiculturalism can play a crucial role in enhancing EE by providing diverse perspectives and knowledge about environmental issues. One of the proposed contributions of multiculturalism to environmental education (EE) is through policy planning and implementation. This approach recognizes that different cultures have unique values, beliefs, and practices related to the environment.

Therefore, integrating these diverse perspectives into environmental policies and programs can lead to more effective and culturally appropriate strategies for addressing environmental issues. It is essential to recognize and embrace the diversity of cultural perspectives to develop more comprehensive and effective strategies for

addressing environmental issues. The second proposed contribution of the multicultural approach to EE addresses the content of EE and how it can be integrated into a multicultural framework.

Kymlicka (2016) proposes that multicultural EE should include three different types of content: a) modifying universal environmental topics to address the specific needs and perspectives of different cultural groups. b) Topics related to environmental epistemologies and practices unique to other cultures: These are topics that reflect the specific knowledge and practices of other cultures in regard to the environment.

Through these topics, students can gain a deeper understanding of diverse environmental perspectives and learn from other cultures' practices. By incorporating these different types of content, multicultural EE can provide a more comprehensive and inclusive understanding of environmental issues.

It can help to bridge cultural divides and promote environmental justice by recognizing the different ways in which cultural groups experience and interact with the environment. Therefore, current multicultural education model emphasizes a holistic perspective that recognizes the interconnectedness of all aspects of human life and experience.

This includes recognizing and celebrating the diversity of cultures, languages, and experiences that exist within our communities and schools, and using this diversity as a source of strength and learning. Ultimately, the goal of multicultural education is to help students develop skills, knowledge and attitudes needed to succeed in an increasingly diverse and interconnected world.

2. Publications

1. Hamdan, F. Lara-Sánchez, AJ., Arufe-Giráldez, V. (2023). Long-term environmental awareness and attitudes among Israeli Junior High school students.

EDUCA : International Magazine For Educational Quality.

2. Hamdan, F. Lara-Sánchez, AJ., Arufe-Giráldez, V. (2023). Critical thinking in environmental education through digital games among students.

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View Appendix 3 and 4.

3 .Purpose and Research Objectives

3.1 Research Main Purpose

The aim of this study was to gather and compare Non-Israeli and Israeli educators' perceptions, attitudes and concerns about environmental issues. Similarities and differences were described regarding participants' environmental concerns.

3.2 Research Objectives:

- a) To check the value of the course in Ofri Center: its effectiveness (high level of proficiency in critical thinking concerning environmental issues.
- b) To examine whether the hypotheses of this research confirm the subscales of the EAS -Environmental Attitude Scale among the Israeli and non-Israeli's participants.
- c) To analyze the projects results and to conclude participants attitudes and responsibility towards environment.

- d) To use research findings which are essential, as a part of professional development. Therefore, while a professional development is performed changes in educational programs are required unless it is needed.

3.3 Hypotheses of my Research

Environmental Attitudes among Non-Israeli and Israeli participants will be sustained effectively according the following criteria:

If the system of pedagogic curriculum will provide participants opportunities environmental activities aimed at developing diverse attitudes towards their environment.

1. If the participants will be revealed to views of knowledge to raise their environmental ideology concerns.
2. If the participants will participate in the local project "Water is the essence of life".
3. If the model of instilling environmentally responsible attitude will be implemented and assimilated in the syllabus.

3.4. Methodological Fundamental Research

In my research, I have revealed that attitudes and attitude measurement are critical components of teaching and assessment processes. The existing research establishes the fact that young people are concerned about environmental issues and that their attitudes depend upon many variables including sex, age, race, and location. A behavioral change is a function of change in behavioral intentions, which consist sum of attitudes to perform a behavior. As an alternative point of view, attitude is determined by the way in which we evaluate an object and its ideology. It combines both affect and cognition implicitly in a single summation.

Some other theorists, including Rokeach (1968), refer to attitudes as the organization of beliefs, evaluative beliefs, and affect regarding the object. There are many components to attitude, and they must be measured and integrated into one bigger frame.

Even though its complexity, this appears to be a more realistic way to represent attitudes. It is important to mention that developing positive attitudes towards environment starts by providing several pedagogical characteristics, which are emphasized in my research, based partially on scientific researches.

These pedagogical characteristics are : instilling verbal-linguistic intelligence about the environment ,approaching musical intelligence in the classroom where it facilitates brain development and gives them the opportunity to listen a selection of environmental problem sounds , ability of students to understand the components of visual and spatial displays concerning the environment , developing an ability to manipulate objects skillfully and the ability to use the entire body to relate thoughts and feelings, acquiring an interpersonal intelligence . This process of study will raise the environmental awareness knowledge levels and will enhance positive attitudes towards the environment.

Yet, we can't ignore the main goal of Environmental Education (EE), which focuses to develop an environmentally literate society. Two factors contribute to behaviors are knowledge and attitude which are main keys to Environmental Education. This is the reason that it is required to overcome an obstacle to developing environmentally responsible citizens due to a lack of awareness of all the factors that affect the development of environmentally responsible behaviors (Hines, Hungerford, &

Tomera, 1986-1987). Environmental knowledge is the ability to understand and evaluate the impact of society on the ecosystem (Gambro & Switzky, 2006).

In order to create an effective EE program, knowledge, attitudes, and behaviors must be included. Consequently, environmental attitudes and behaviors are important to determining environmental actions. (Borden & Schettino, 1979).

According to Leeming, Dwyer, Porter, and Cobern (1993), environmental quality can be preserved by behavior changes. In a review of studies on outcome research in Environmental Education - (EE), Leeming et al. (1993) found that most of the work they reviewed focused on changes in attitude, knowledge, or both, but few of the studies addressed changes in behavior. Researchers who conduct EE research regularly examine relationships between knowledge, attitudes, and behaviors related to the environment (Eagles & Demare, 2009; Leeming, Dwyer, & Bracken, 1995; Tikka, Kuitunen, & Tynys, 2012), and they have identified responsible environmental behaviors as evidence of effective EE (Gotch & Hall, 2014; Ramsey & Hungerford, 1989). According to the reviewed research, attitudes are learned responses toward attitude objects. Educators in the academic field may have an impact on a teacher's affective and cognitive attitudes. On the other hand, Various theories suggest that attitudes are composed of three major components: affective, cognitive, and behavioral (3,115,118,119). An individual's affective component can be defined as their feelings or emotions about an attitude object; their cognitive component can be defined as their knowledge about the attitude object; and their behavioral component can be defined as how they behave when dealing with the attitude object.

In order to cultivate positive attitudes, teachers need to understand what their attitudes towards attitude objects are, how the attitude objects affect these attitudes, and how to cultivate positive attitudes.

Several instruments have been developed to measure environmental attitudes for both qualitative and quantitative research. Four techniques to measure attitudes have been used by researchers most frequently: the Likert scale, interest inventories, semantic differentials, and emerging methodology. The Children 's Environmental Attitude and Knowledge Scale (CHEAKS) was designed to provide global measures of environmental attitudes and knowledge. The CHEAKS scale was based on an instrument introduced by Maloney and Ward (1973) and included subscales of verbal commitment, actual commitment, affect, and knowledge. The supported hypotheses of this study confirm the theoretical relationships from abstract cognitions to specific behavior, a values-attitudes-intentions-behavior hierarchy. In the string of interrelated variables, values did not correlate with intentions, attitudes, or behaviors. Therefore, excluding one variable greatly decreases the model's anticipating strength.

This study highlights the importance of implementing a fully operationalized model for research involving environmentally responsible behavior. Many of these studies report a low correlation between environmental attitudes and behavior, due to the indirect relationship between attitude and intention. The results support Bentler and Speckart's (1981) argument that the eradication of intention directs to a more avaricious model, but one that is simpler than reality. In this study, a questionnaire with 5 subscales of verbal commitment, actual commitment, affect, and knowledge has been developed. So that, the ethnical and the pedagogical aspects are combined through Environmental Attitude Scale (EAS) with the Environmental Knowledge Test

(EKT) based on the module “Water is the essence of life “, where these tests strengthen a personal environmental knowledge base among participants, which propose a diverse technique and features within various sequential steps. Some suggested characteristics are the following: (a) direct aesthetic experience with the natural environment (Gigliotti, 1990), (b) Enhancing participant ownership of environmental restoration activities (Hartig, Kaiser, & Bowler, 2001), (c) sensitive or emotional content (Armstrong & Impara, 1991; Pooley & O'Conner, 2000), (d) a multi-sensory learning environment to promote student engagement , and (e) Empowerment, responsibility and ownership are promoted by relevant and personal information.

4. Fundamental Methodology and Methodological Tools

4.1 Theoretical Method: Experimental work on instilling responsible attitude to nature.

Environmental literacy is considered the paramount objective of Environmental Education programs (Disinger & Roth, 1992; Hungerford, Peyton, & Wilke, 1980; Iozzi, Laveault, & Marcinkowski, 1990). Although no formal universal definition exists for environmental literacy, Marcinkowski and Rehrig (1995) and Environmental literacy definitions are generally based on the principles identified by Simmons (1995, 1998). Knowledge and skills relevant to environmental issues, such as environmental knowledge, ecological knowledge, and skills required to analyze environmental problems, as well as behavior patterns designed to limit individual environmental impacts, therefore contributing to societal efforts to improve the environment are among these factors. Hungerford and Volk (1998) argued that the primary difference between Environmental Education and other educational disciplines is that it aims to

introduce concepts, environmental issues, and environmental action strategies; to teach students to use these strategies; to influence students' behavior. Accordingly, most definitions of environmental literacy are reflected, include a behavioral component.

Therefore, as part of this research, has been developed an operational definition of environmental literacy based on the integration of previous definitions (Hungerford & Volk, 1998; Marcinkowski, 1998a; Simmons, 1998). It included four primary categories: (a) knowledge, (b) attitudes, (c) behavior, (d) responsibility. Therefore, there is not a universal definition of environmental literacy (EL). As defined by Roth (1992) and Disinger and Roth (1992), depending on the individual's values, environmental sensitivity, environmental attitudes, and locus of control, environmental literacy can be constructed as the interaction between ecological and affective attributes., which have also been categorized as psychosocial variables (Mines, Hungerford, & Tomera, 1986-1987). A person who has environmental literacy possesses the values, attitudes, and skills necessary to convert knowledge into action. An individual's attitude toward the environment reflects their level of environmental literacy. Therefore, improvement of environmental literacy is focused on the expansion of responsible environmental behavior. On the basis of the assumption that variables that foster environmental literacy can anticipate responsible environmental behavior, environmental literacy variables are commonly used as parameters of responsible environmental behavior (Hines et al.; Hsu, 2004; Sia, Hungerford, & Tomera, 1986).

Observed behavior can provide information about a person's environmental literacy (Roth, 1992). Roth contributes to the characterization of students' environmental

literacy by examining their environmental behavior from the perspective of environmental commitment, emphasizing the relationship between responsible environmental behavior and environmental literacy.

Rather than defining environmental literacy as a binary characteristic (i.e., literate or uneducated), Roth defined it as a progression of abilities from zero to advanced developing stages of accomplishment. However, "the degree of environmental literacy is reflected in the breadth of human/environment interaction to which that person brings to bear all the skills and knowledge that define operational environmental literacy" (Roth, p. 19). According to study review, environmental commitment entails a broader range of interactions between humans and their environment where students apply their knowledge, attitudes, and skills. A high environmental commitment indicates a broader range of interactions with the environment. Furthermore, I have been revealed that evaluating students' behavior in terms of their engagement in different categories of environmental action reflect into different levels of environmental commitment which provides insights into where the students are situated on the developmental continuum of environmental literacy.

Yet, many researches in Israel have indicated that new students in teacher-training programs in Israel are characterized by a low level of environmental literacy referring to reported environmental behavior. Students determined restricted performance of behaviors that demand a high level of responsibility and thus reflect a high level of environmental literacy and conversely.

On the other hand, there is an alternative structure in order to evaluate environmental behavior from the viewpoint of environmental commitment. It also indicates the environmental-cultural student background in Israel.

Actually, three main characteristics such as culture, conditions, and societal preferences should be taken into consideration when developing and adapting environmental education. It is recommended to take cultural factors into consideration, so that environmental education would be designed and adapted for each country and its society. On the other hand, it can't be ignored that culture plays a huge role in shaping a person's values and behaviors, as does the environment in which he or she grows up and lives (the ethnic environment). (Nasser et al., 2002). In this study, environmental behaviors of educators from different ethnic backgrounds have been compared and it is noticed that they are differed. According to my findings, social trends exist in other countries as well. In the present study, I have predominantly integrated these features into the categories of attitudes rather than behavior. In addition, I have defined empirical perceptions of teachers' environmental encounters.

For example, In the survey instrument, I asked students about the role adults play in environmental activities, the types and extent of nature excursions students take, and their ability to analyze environmental problems at a higher cognitive level. Actually, knowledge is the environmental-literacy category most emphasized in the project: "Water is the essence of life". Yet, educators from different countries usually appear to have only a modest effect on environmental attitudes and behavior before being exposed to environmental outdoor activities or projects. Public involvement is essential to addressing many environmental challenges such as litter control, air pollution from mobile sources, low levels of recycling, and water conservation. **"Water is the essence of life"** is a separate unit, plays a critical role in developing educators' environmental attitudes. It is important that each country or community develop its

own environmental education programs suitable to each country's socio-cultural condition. In my research, the two groups, who completed Environmental Course, were also exposed to the environmental Program, GLOBE, based their arguments on concepts in data interpretation, they purchased within their studies. Both groups, gain a scientifically meaningful data and had to implement their analyze on what they have already learnt during the course.

Yet, Globe Program has provided them facts or opinions about environmental issues and has enhanced everyone's problem-solving and decision-making skills. This is the main step in Environmental Literacy.

5. Empirical Data Analysis

5.1 Methodology Tools

An environmental attitude questionnaire modified from two well-known instruments the NEP (Dunlap and Van Liere, 1981) and EAS - Environmental Attitude Scale was used to survey educators' attitudes towards the environment over the course of one school year, (Leeming, Dryer and Bracken, 1995). In this study, instruments were chosen to measure various components of a model of attitude systems.

Scaling beliefs and values was measured in the NEP - measured in the cognition's component, whereas behavior intentions, behaviors, and affective responses were measured in the EAS.

Israeli and Non- Israeli teachers' attitudes about water-related environmental issues were measured through the use of the Survey of Environmental Attitudes and the Teacher Interviews Protocol. The survey was administered and interview protocol in Israel. Data were collected during the months of December 2021, January- April 2022

(2 semesters). In this study, instruments were chosen to measure various components of a model of attitude systems. The NEP measured in the cognition's component, scaling beliefs and values, while the three sections of EAS -Environmental Attitude Scale measured behavioral intentions, behavior, and affective responses. A questionnaire was chosen to measure the components of the attitude system. A questionnaire was designed to assess participants' concerns and perceptions of environmental issues. Two groups of participants were asked to respond to the Survey of Environmental Attitudes: those participants who **completed** the water-related environmental issues curriculum project testing, and a **control** group of participants who **did not complete** the water-related environmental issues curriculum.

5.2 The Questionnaire

The Questionnaire: This study is a survey of science educators' attitudes towards the environment over one school year using a questionnaire modified from two **well-known environmental attitude instruments, the NEP** – New Environmental Paradigm (Dunlap and Van Liere, 1981) **EAS** -Environmental Attitude Scale (Uzun and Saglam ,2006) which contribute to measure teachers' attitudes towards the module "Water is the essence of life ". Mostly, data was collected using a questionnaire because: Instruments had to be appropriate for high school classrooms setting.

Due to the large number of students being studied, the instruments would have to collect as much information as possible in a short amount of time without interfering with regular classes. It was necessary to have a relatively high response rate. Due to the fact that attitude was being measured, respondents had to take sides on the issues in question. In addition, it was also vital that the attitude system components were

measured by a valid and reliable instrument. A questionnaire was designed to assess participants' concerns and perceptions of environmental issues.

A brief questionnaire was to determine some of the cultural factors that may provide insight and add depth to the study. A questionnaire is recommended for this type of investigation. Using two different instruments to measure attitude, triangulation was achieved through measuring attitudes across two different groups, Israelis at large and Environmental Studies sample group. As a result of using instruments with a record of success in attitude measurement, validity was also enhanced. Instead of developing an instrument specifically for this study, established instruments were studied in depth and then selected. Due to the growing amount of recent literature supporting this practice (Benton, 2003; Gray, et al, 1995).

Two groups of attitudes were identified within the survey sample, though these were interrelated. Two groups of participants were asked to respond to the Survey of Environmental Attitudes: those participants who completed the water-related environmental issues curriculum project testing, and a control group of participants who did not complete the water-related environmental issues curriculum.

The data gathered with the Survey of Environmental Attitudes was analyzed using t-tests and chi-square analysis in the Statistical Package for Social Sciences (SPSS), determining means, standard deviations, and percentages through descriptive statistics. The method consists of factor analyses for the results of the EAS scales analysis, determining internal reliability for the categories resulting from the analysis of the EAS scales.

A comparison of the two groups (Israeli with Non-Israelis; treatment with control) was analyzed in an attempt to discover any similarities or differences between the two groups of subjects in relationship to their attitudes about water –related environmental issues. “Water is the essence of life”. This project is designed to promote the awareness of a water-related environmental issues. The project curriculum is jointly developed by the interdisciplinary team of scientists, instructors and myself.

We used Pearson's correlation to determine the relationship between the environmental behavior categories (i.e., categories that resulted from the EAS scales analysis).

The curriculum goals are: to understand critical water-related environmental issues that pertain to personal quality of life ; to develop a broad understanding of the water-related issues that are critical to environmental quality of life in the biosphere; to identify critical water-related environmental issues in the local environment; to become familiar with strategies for identifying and implementing water management-related functions; to explore and formulate solutions for local water-related environmental issues ; to identify critical water-related environmental issues; to identify effective curricula and strategies for teaching water-related interdisciplinary topics.

5.3 Factors Influencing Environmental Attitudes:

It has been revealed to a few theoretical models explain the origins of people mainly the cross-national differences in environmental attitudes although there is an unresolved debate in environmental sociology as how to a nation's wealth as well as individual prosperity which is related to environmental concern or sociodemographic

effects such as age and gender. It has been found by Zeleny (2011) that women have higher environmental concerns than men despite being of a lower income or education level. Other researchers like Bogner (2016) have focused on effectiveness of various experiences to develop environmental sensitive attitudes among young students and young activists. Bogner have revealed in his study that teachers and students who develop positive attitudes towards the environment related with chattering about the environment in their routine life, watching nature films, reading about the environment, participating in nature-related activities. Furthermore, previous studies present those positive experiences with nature in childhood, outdoors settings as natural areas, are the most significant life experiences in developing environmental attitudes. Yet, the possible influence of values and beliefs such as altruism seems to be linked to environmental concerns. As Dietz (2005) states, 'concern' refers to both a sense of importance and the belief that it may be threatened. Dunlap and Jones (2002, see Alibeli & White 2011, 1) according to these authors, environmental concern is the extent to which people are aware of environmental problems, indicate their willingness to participate in their solution and support efforts to resolve them. The degree of environmental concern in a society has been found to influence its environmental behaviors, for example, Franzen and Meyer (2009).

Actually, we can define Knowledge as familiar with facts, proofs, or principles. The more knowledge gains a person about his/her environment, the more acquaintance to his/her environmental awareness. Our environment, however, plays an especially crucial role in determining cause-and-effect relationships.

The third approach to environmental education could be a predictor of environmental attitudes. During this time of basic material needs, environmentalists tend to become more materialistic, and those who are most materialized in their values are more likely to become environmentalists and to present pro-environmental behaviors. The other one focuses on four general value clusters: self-interest, altruism, traditionalism, and openness to change. (Stern 2000.)

5.4. Development of the Participant Attitude Assessment.

The pedagogic developer must collect as much relevant data about attitudes and attitude measurement as possible in order to improve teaching and learning as (106). Simmons (2000) outlines the importance for pedagogical developers to study the attitudes of learners in order to demonstrate achievement relationships and to determine the effect of specific pedagogy.

Simmons (2000) concluded that the instrument that will measure the relevant construct should be identified; if no existing measure is available, the developer will need to construct his/her own attitude assessment instrument recognizing the importance of reliability and validity of information which are essential.

Various theories propose that attitudes are composed of three major components: affective, cognitive, and behavioral (3,115,118,119). Individuals' affective, cognitive, and behavioral components can be described as their feelings and emotions related to attitudes, their knowledge of attitudes, and their tendency to act upon attitudes.

In addition to facilitating and collaborating with others who have the same views, attitudes assist people in adapting to new environments by providing predictability

People develop attitudes because their attitudes: a) adjust them to organize and even to simplify very complex input from their environment. b) defend their confidence by avoiding from unpleasant truths about themselves .c) help them to be adapted to their diverse world by maximizing their rewards from the environment. d) consent them to express their fundamental values. (121). There are six characteristics that can be used to describe attitude, according to Shaw & Wright (1977) :

1. A person's attitude is shaped by an evaluation of a concept about a referent object and motivates her behavior in response to the concept.
2. Various attitudes are classified as either positive, neutral, or negative, depending on their quality and intensity (or strength).
3. A person's attitudes are learned rather than innate. They can be inherited or developed through constitutional development.
4. The attitudes may be influenced by a specific social reference, or by
5. a specific class.
6. Different attitudes are interconnected to one another to varying degrees.
7. Attitudes are relatively stable and enduring. (107,108).

Scott (1968) identified eight characteristics of attitudes that can be measured. They are summarized as follows:

1. Direction - An object's direction can indicate positive or negative feelings.
2. Magnitude - the degree of favorableness or un-favorableness.
3. Intensity - the “strength of feeling” associated with the attitude.
4. Ambivalence – When there is both an unfavorable and a favorable attitude toward the subject.

5. Salience/Centrality – An individual's predominant attitude, i.e., the one that guides their behavior in a significant way.
6. An individual's affective salience is determined by how emotional he or she becomes after making an attitude judgment.
7. An attitude can be modified or varied easily when it is flexible.
8. An attitude's embeddedness determines how isolated or connected it is (with other attributes of that attitude). (123).

Prior to developing or selecting a measure of attitudes, it is necessary to define what is meant by the concept. In research, attitudes are viewed as hypothetical constructs, whose most prominent feature is that they are evaluative. (68,69).

As Lemon (2003) points out, attitudes are created by a disposition to respond positively or negatively to attitude objects. Attitudes have other attributes that the researcher can measure attitude-relevant beliefs; attitudes 'relation to a person's central values; and basic personal needs (68).Gardner (1995) reviewed a variety of techniques to measure attitudes. The first technique is known as the Likert scale method where respondents read each item and then respond along a range of categories from "strongly agree" to "strongly disagree". (33).

The second method, known as interest inventories, is described by Gardner (1995) as a method which "... typically contains a list of careers, topics, or activities, and the respondent indicates those in which he is interested"" (p.7).

In recent quantitative research, the semantic differential has been used by a significant number of researchers (Gabel, 2004). The instrument consists of statements that are responded to through pairs of adjectives that form scale end points. Emerging

qualitative research methodologies were referred to by Gardner (1995) as “clinical” or “anthropological.” These methods involved interviews with students, nonparticipating observation of class sessions, and participating observation of classes. As suggested by Roueche (1989), five techniques could be used to manage the attitudes of students: authority, role-playing, introduction of cognitive dissonance, and social learning by classroom environment control, and identification and modeling. The techniques proposed by Roueche, et al. (1989) provide pre- and post-tests and a self-assessment inventory that helps the instructor determine his/her feelings toward managing student attitudes. Since the 1980s, research has been conducted increasingly on the relationship that exists between student attitudes toward science and science achievement. As part of their study, Smith et al. (2004) measured change in attitudes among diverse groups in the United States in order to answer two research questions:

1. Does the Test of Science-Related Attitudes (TOSRA) accurately measure the construct 'attitudes toward science'?
2. Are there any differences between male and female high school students when it comes to their attitude toward science ?

According to Smith et al. TOSRA can be used to assess the academic performance of American students, as a valid and reliable instrument for use with American students. In spite of female's report having poorer attitudes towards science, there is no difference between their attitudes regarding the performance of experiments or the social importance of science. (108).

As described earlier in this chapter, the existing research establishes the fact that young people are concerned about environmental issues and that their attitudes

correlate with many variables including sex, age, race, and location. The research also affirms the need for a change from the traditional model of instruction, which is based on issue awareness, to a model that includes student interpretation of environmental issues. Several instruments have been developed to measure environmental attitudes. Research conducted by Leeming, Dwyer, and Bracken (66,67) measured children's environmental attitudes and knowledge through the Children 's Environmental **Attitude and Knowledge Scale (CHEAKS)**. The instrument consisted of two subclasses, Attitude and Knowledge, and the CHEAKS Total Scale.

The attitude items were sampled systematically from six content-dependent subdomains: animals, energy, pollution, recycling, water, and general issues. Because the CHEAKS was desired to provide global measures of environmental attitudes and knowledge scale, a single global factor emerged upon separate analyses of the attitude and knowledge data. As a result of the CHEAKS scale, various interventions could be evaluated and compared according to a common standard.

In order to promote pro-environment attitudes and behaviors, these comparisons helped develop more effective interventions. (67).

The CHEAKS scale was based on the Ecology Scale first introduced by Maloney and Ward (1973). On the other hand, I have recently found out that using the EAS was modified for this study to determine high school teachers and instructors 'attitudes towards water – related environmental issues is the most efficient tool to examine their attitudes in the evaluation of environmental studies or Science curriculum and the development of planned behaviors.

The EAS (Environmental Attitude Scale) has three main subscales which are the environment opinion, knowledge towards environment and Environmental Behavior. In this case, it was selected the main subscales towards water related-environmental issues. The three main subscales are mentioned below:

1. The verbal commitment subscale measured what a person states he/she is willing to do in reference to environment issues.

2. The actual commitment subscale measured what a person actually did in relation to environment issues.

3. The affect subscale measured the degree to which an individual was emotionally involved with environmental issues.

These items were then field-tested with Israeli participants and non-Israeli participants, based on the research focus on environmental attitudes, the verbal commitment, actual commitment, and affect subscales of the EAS -Environmental Attitude model was used to develop the first draft of the Survey of Environmental Attitudes (see Appendix A).

“Water is the essence of life” Project focused on the development of responsible stewardship, using water-related issues as the content focus. The study was designed to compare Israeli participants and non-Israeli participants' attitudes about water-related environmental issues and in the environmental studies curriculum.

There is a relatively rich set of affective outcomes are part of the curriculum, including the value of water as a finite resource needed to sustain a healthy ecosystem which includes humans, (2) the appreciation that the availability of water from a variety of water sources depends on people's care of the environment, (3) the appreciation that the quality and safety of water depends on people's care of the

environment, and (4) the value of stewardship of the environment as the responsibility of all citizens.(37).

This study focused on attitudes fostered by the curriculum as measured by verbal commitment, actual commitment, and affect. Consequently, the content of the Curriculum needed to be defined in terms of feelings or actions individuals could have or take in response to the knowledge communicated by the Curriculum.

"Water is the essence of life" curriculum was developed to emphasize the fact that scientific concepts and theories are important to the social and political decisions made by individual citizens and their governments. Consequently, it was the attitudinal components of the ecology scale that were most relevant to the curriculum being tested.

The instrument included two global questions, one related to water as a finite resource, and the other focusing on stewardship of the environment as being critical to the protection of water resources.

The other two categories – water availability and water quality – were probed in more depth because a substantial number of the curricular activities related to these areas. In each category questions were developed to probe the participants' attitudes toward personal involvement, community involvement, state involvement. Items for three subscales (verbal commitment, actual commitment, and affect) were randomly mixed in the Survey of Environmental Attitudes.

Items in verbal commitment, actual commitment, and affect scales are presented in a true-false format. An approximate half of the items are positively worded and half are negatively worded to control for acquiescence and negative sets.

The final draft of the Survey of Environmental Attitudes was evaluated by one professor from Seminar Oranim College, Prof. Uri Zoller, knowledgeable in science education and environmental education.

Their written feedback indicated that all items seemed to fit well within the verbal commitment, actual commitment and affect scales. The curriculum offers an integrated focus to understanding the use of water in Israel and in different countries. Through various critical thinking activities, teachers (a) develop a common knowledge about the use of water and water issues within the context of scientific, economic, political, historical, and cultural factors that influence decision making and the development of public policy; (b) develop analytical skills and problem-solving strategies in formulating the major water issues that will need to be addressed in Israel and different countries during the next decade ; and (c) share information about local water resources via e-mail or internet. Using questionnaires and interviews, student environmental concerns were elicited and compared, along with their reasons for concern, sources of knowledge, assignment of responsibility for solving the problem, classification of concerns (e.g., local, national, global), and the ease of solving problems.

Finally, the knowledge subscale measured specific factual knowledge related to environmental issues. Items in verbal commitment, actual commitment, and affect were presented in a true-false format.

Actually, two-factor (Groups x Subscale) analysis of variance showed a significant interaction. Comparisons across the three affective scales suggests that "... most persons have a relatively high degree of verbal commitment and affect, with lower levels of actual commitment and knowledge" (p.585).

Later, Maloney, Ward, and Braucht (1985) refined and shortened the original scale "... in an attempt to provide a more practical and efficient instrument" (p.787).

The shortened scales for affect, verbal and actual commitments had a true-false format that was more resistant to possible systematic response biases. (74,125).

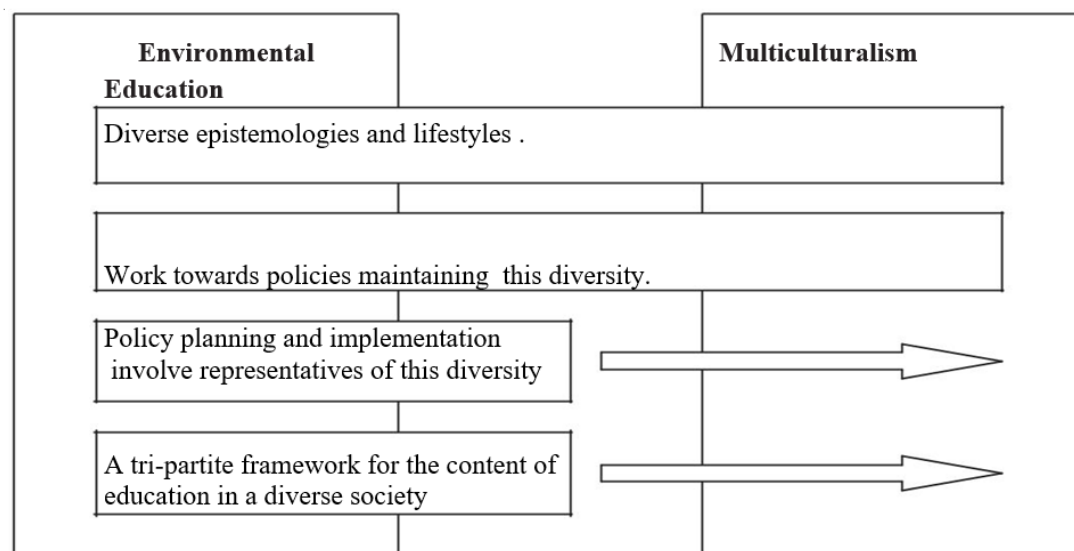
5.5 Concerns for the environment in Developed and Developing Countries.

A comparison of Multicultural Education and Environmental Education:

Several attempts have been made to define multicultural EE might consist of.

An example of this is Marouli (2002), who suggests seven components: a culturally diverse group, "culturally diverse educational materials and activities", the use of diverse pedagogies, "respecting cultural diversity", and Incorporate multiculturalism into mainstream EE by developing a cultural lens, empowering participants, and activating them against social inequality. According to Vargas (2000, p. 377), multicultural education should incorporate modern knowledge, which he advocates, as well as interdisciplinary approaches, teacher training, in-service training, curriculum that emphasizes sustainability, social and environmental justice, political involvement, and respect for indigenous cultures.

Figure 1 A comparison of two differences between EE and multiculturalism, and how EE can adopt multiculturalism's features (indicated by arrows).



As Marouli (2002) and Vargas (2000) stress, environmental justice also plays a crucial role in cross-cultural EE program, which was evident in an empirical study in Israel. (Tal & Alkaher, 2010). Toward conceptualizing current and possible intersections between multicultural education and EE appears in Figure 1. The first two points exist today as elements shared by both multicultural education and EE: It is important to mention that in a heterogeneous society, acknowledging the impact of diverse epistemologies and lifestyles, as well as developing policy approaches that support and enable such diversity. The two points below these are not currently comprehensive efforts in EE. The first of these presents' ways for representatives of the different groups in designing and implementing educational plans and programs- the practical level, comparing to the second point indicates the theoretical level, and connects to the content of education.

An interesting proposal was described by the researcher Kymlika's (2008) who emphasized the importance of the contribution of multiculturalism onto EE. There are parallels between multiculturalism's first contribution to EE and other aspects of social interventions, including health, planning, and communication, which are based on policy planning and implementation. Due to the failures of intervention efforts in areas such as health, planning, and social marketing over the last few decades, it has become increasingly important to involve the interventions' subjects and other stakeholders in order to make a progress. (Innes & Booher, 2004; Minkler & Wallerstein, 2008; Negev, 2012; Smith, 2000).

Although EE that is devoted to environmental justice requires participation from the broader community, expanding the role of representation in EE policy making and implementation could generally contribute to the field of EE. According to the

multicultural approach to EE, the second contribution addresses the way multicultural frameworks would be impacted by the contents of EE.

Kymlicka's (1998) scheme, has explained previously, that multicultural EE would contain three different contents: generic topics (perhaps modified to address particular groups as necessary); unique topics for a given group rooted in their unique situations and contexts; and environmental epistemologies and topics unique to other. A shared conceptual vocabulary for understanding environmental problems can be useful for populations dealing with severe environmental problems in an era of globalization. Nevertheless, environmental problems affect some populations more than others, especially those who are economically deprived.

Considering critical multiculturalism, it is important to emphasize on environmental justice regarding the group at stake. By adapting such materials to the different segments of society, knowledge can be transmitted more effectively and engagement can be increased more efficiently. (Banks & Banks, 1995). Second, the treatment of environmental topics in terms of the values and context of a particular subpopulation, which is the process by which core topics are "adapted" to particular audiences. In the second kind of content, core topics are "adapted" to particular audiences' needs and circumstances, namely addressing environmental issues according to the values and situation of the particular subpopulation. Its lifestyle also impacts other groups' environmental justice issues as well as its blind spots regarding the environment.

It is possible that even within an organization, there are tensions regarding how to accommodate its values with the environment. The third content component addresses the ways in which groups from different countries can learn from each other, for example in the area of human-nature interaction, and sustainable natural

resource management. The distribution of resources and environmental justice issues that another groups face is additional cross-group dimension. Openness between groups has limits since different groups are more or less ready to interact with one another. (Singh, 2005). This research focuses on promoting the first two components mentioned, while addressing the third component consists a longer-term goal.

Therefore, the research focuses on promoting the first two mentioned components, where the third component has as a longer-term goal. This broad description of multicultural employment leads to a case study of how these suggestions are implemented in a society where environmental social promote complicated issues.

In general, there is a strong correlation between cultural differences and the distribution of natural resources, policy formulation, and participation in decision-making and budget allocations. As a result of an empirical research in two different societies in Israel, it has been expressed that an effective EE must take into account these cultural differences.

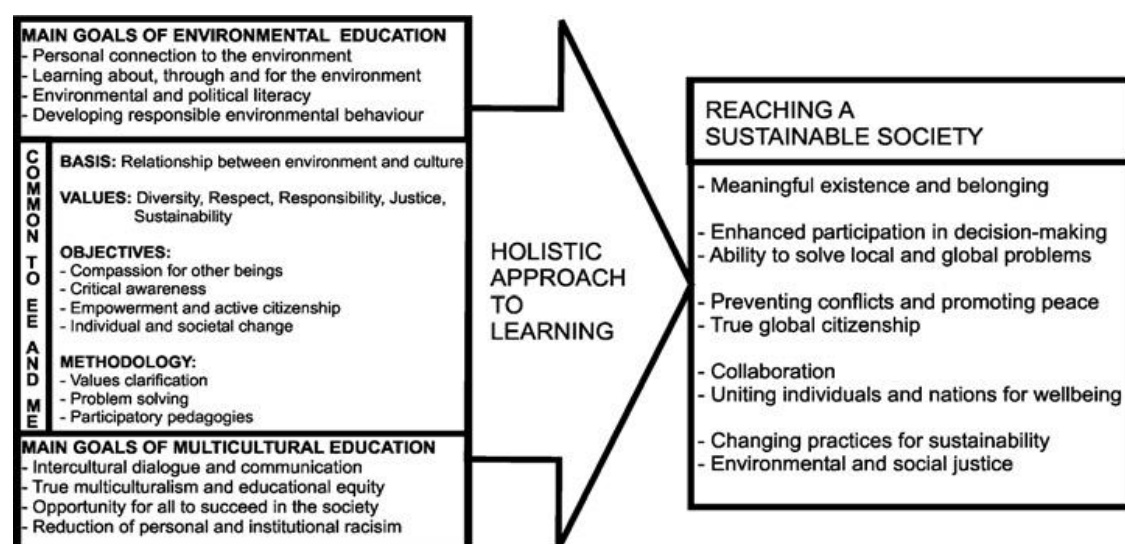


Figure 2 Environmental and multicultural education as means for holistic learning for sustainability. (Sirpa Tami, 2018).

Diversity in policy making is one approach, as is a modular framework that encompasses both core and unique content and values, including resources relating to the environment. Multicultural education provides several ways to accomplish these goals. As a result of a multicultural perspective, nonfinancial resources such as knowledge, experience, time, and equipment are also exposed as alternative, community-based EE frameworks. The state has a complex relationship with marginalized minorities and they often suffer from environmental injustices. In order to create a better environment for all groups in society, but also reduce environmental inequalities, fair, meaningful, and effective EE must incorporate these aspects both in terms of content as well as practical means and tools. Multiculturalism can also serve as a framework for achieving these goals.

Global education for global understanding: the case of Finland

To achieve effective EE, it is necessary to consider the differences between two societies in Israel. Nonetheless, multicultural education has provided several means to accomplish this, including diverse representation in policymaking and a modular framework that incorporates both core and unique contents and values, as well as religious resources that are environmentally related.

In order to advance a better environment for all groups in society, and to reduce environmental inequalities, fair, meaningful, and effective EE must incorporate these aspects both in content and in practical means and tools, and multiculturalism can serve as a framework in this regard.

6. Study Results

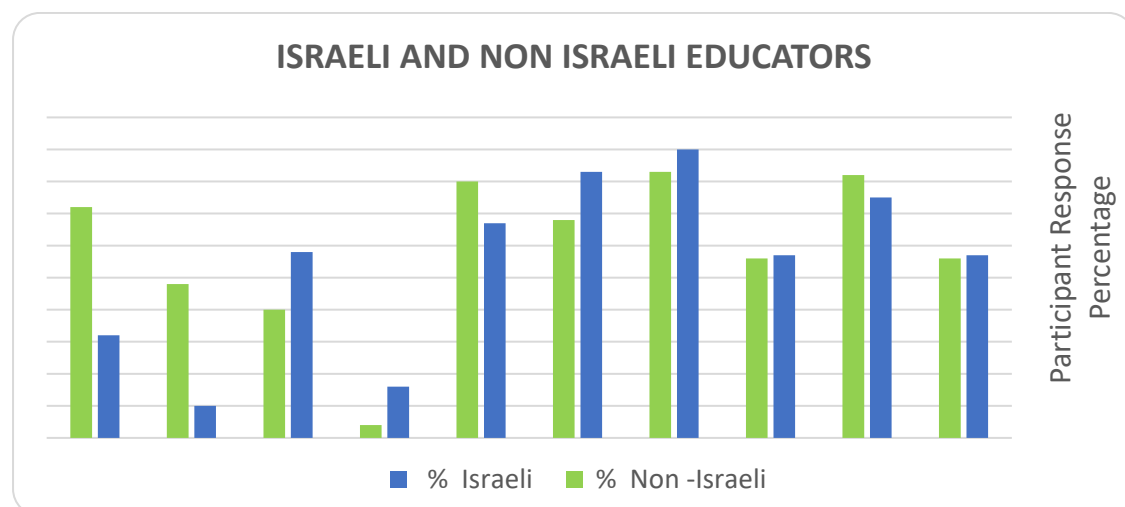
6.1 Results of experimental work about Instilling environmentally responsible attitudes in educators.

6.11 Comparison of Non-Israeli and Israeli participants Concerns.

Table 1 A Comparison of Non-Israeli and Israeli participants Concerns:

Environmental Issues	% Non -Israeli	% Israeli
Climate Change	56	57
Air Quality	82	75
Global Warming	56	57
Water Quality and Supply.	83	90
Food Contamination by pesticides/hormones.	68	83
Trash / litter	80	67
Radiation / Nuclear	4	16
Noise Nuisance	40	58
Overpopulation	48	10
Deforestation	75	33

Percentage of participant responses during their course.



These results emphasize the majority of Non-Israeli Educators main concerns and the reasons are mentioned in the questionnaires:

(a) Air quality (82%) – industrial development, growing population density has brought in their wake pollutant emissions from both stationary and mobile resources in the main cities in different countries.

(b) 75% of the Non-Israeli Educators respond about deforestation as one of the main environmental issues. Though a part of this degradation is due to climate change (56%) and other natural processes, a majority is because overgrazing, fire, and human maladministration), in contrast to 57% percentage of the Israeli Educators' responses. 80% of the Non Israeli Teachers respond about waste.

c) Israeli teachers have mentioned the increase of municipal waste and the unregulated garbage dumps. Which mainly cause an aesthetic blight (dirty street and also groundwater and soil contamination).

In contrast, most of the Israeli Educators included the scientific reasoning such as (a) combination responses of water resources and water pollution (90 %) – Israel's water resources are limited by the country climate and also water resources contamination; (b) Air quality (75%) – air pollution kills plants and animals if it continues, when people burn fossil fuels it goes into the air.

Are there differences in environmental attitudes between educators who completed the environmental curriculum course and educators who did not complete the Curriculum, controlling for their nationality ?

The participants were asked to respond to the 30-item: Environmental Attitude and Knowledge Scale (EAKS) in a true-false format (see Appendix A).

The participants' responses were coded: 0 - 'true'; 1 - 'false'. A non-parametric correlation test was run using the SPSS package to check one additional time the distribution of the responses by the verbal commitment, actual commitment, and affect scales.

Non-Parametric Correlation Tests:

Tables 1-3 will present the results of non-parametric correlation tests of subscales for verbal commitment, actual commitments, and affect within items 1-30 of the Survey of Environmental Attitudes. Tables 1 and 2 will present the Spearman Correlation Coefficients for the Israeli and Non -Israelis Subjects. Table 3 will present the Non-parametric Correlation for the Israeli Treatment Subjects.

All other items from the Survey of Environmental Attitudes were distributed appropriately under the categories of verbal commitment, actual commitment, and affect. A non-parametric correlation test was run using the SPSS package to check one additional time the distribution of the responses by the verbal commitment, actual commitment, and affect scales. All other items from the Survey of Environmental Attitudes were distributed appropriately under the categories of verbal commitment, actual commitment, and affect.

Table 2 Spearman Correlation Coefficients for Israeli Subjects

Correlation	Treatment (N=171)		Control (N=175)	
	SCC	Significance	SCC	Significance
Verbal/Actual	0.467	<0.00001	0.3581	0.002
Verbal/Affect	0.5.965	<0.00001	0.6001	<0.00001
Actual/Affect	0.3909	<0.00001	0.3061	0.008

SCC - Spearman Correlation Coefficients

Table 3 Spearman Correlation Coefficients for Non -Israeli Subjects

Correlation	Treatment (N=182)		Control (N=184)	
	SCC	Significance	SCC	Significance
Verbal/Actual	0.4223	<0.00001	0.2992	0.006
Verbal/Affect	0.3327	0.003 0.001	0.2857	0.008
Actual/Affect	0.3516		0.3885	<0.00001

SCC - Spearman Correlation Coefficients

Table 4 Non-parametric Correlation Test for the Israelis Subjects Who Completed the Course (Israeli Group)/Treatment.

Questions	Scale	TRUE	% Of Total	FALSE	% Of Total	Spearman	Correlation Coefficients	
						Verbal	Actual	Affect
1	VC	21	30	50	70	0.4059	0.3062	0.3307
2	AC	67	94	4	6	0.0769	0.2808	0.267
3	A	57	80	14	20	0.1773	0.1165	0.16
4	VC	38	54	33	46	0.5637	0.2554	0.4058
5	AC	13	18	58	82	-0.1402	0.2095	0.1754
6	A	42	59	29	41	0.2913	0.2145	0.6226
7	VC	56	79	15	21	0.5432	0.3354	0.2965
8	AC	14	20	57	80	0.2472	0.4997	0.2037
9	A	30	42	41	58	0.1098	0.0136	0.2626
10	VC	45	63	26	37	0.3827	0.2126	0.1544
11	AC	18	25	53	75	0.3891	0.5067	0.2358
12	A	38	54	33	46	0.216	0.0567	0.509
13	VC	42	59	29	41	0.5713	0.2454	0.3927
14	AC	16	23	55	77	0.3294	0.4259	0.2697
15	A	39	55	32	45	0.5888	0.4032	0.62
16	VC	16	23	55	77	0.5324	0.1863	0.1865
17	AC	36	51	35	49	0.2484	0.4207	0.385
18	A	17	24	54	76	0.6002	0.3059	0.6161
19	VC	15	21	56	79	0.5219	0.3319	0.3962
20	AC	10	14	61	86	0.2168	0.4343	0.012
21	A	44	62	27	38	0.237	0.3258	0.5746
22	VC	39	55	32	45	0.6754	0.3761	0.5809
23	AC	9	13	62	87	0.3071	0.5062	0.2979
24	A	34	48	37	52	0.0765	-0.0312	0.2569
25	VC	22	31	49	69	0.4975	0.0635	0.1873
26	AC	12	17	59	83	0.0529	0.2766	-0.2227
27	A	50	70	21	30	0.3735	0.3573	0.5881
28	A	27	38	44	62	0.4926	0.4045	0.4657
29	VC	25	35	46	65	0.6149	0.3541	0.5461
30	A	18	25	53	75	0.2221	0.0187	0.1271

Subscales Attitudes: A - Affect.AC – Actual Commitment.C- Verbal Commitment.

Table 5 Non-parametric Correlation Test for the Israeli Subjects Who did not complete the Who Completed the Course Curriculum. (Teachers Control Group)

Questions	Scale	TRUE	% Of	FALSE	% Of Total	Spearman Correlation Coefficients		
						Verbal	Actual	Affect
1	VC	32	43	43	57	0.2258	0.157	0.0979
2	AC	70	93	5	7	0.1459	0.2755	0.0075
3	A	62	83	13	17	0.1348	0.2373	0.1767
4	VC	52	69	23	31	0.4459	0.079	0.3335
5	AC	4	5	71	95	0.0125	0.2105	0.0473
6	A	39	52	36	48	0.4608	0.0403	0.5092
7	VC	54	72	21	28	0.5356	0.1588	0.2729
8	AC	6	8	69	92	0.2374	0.3099	0.2664
9	A	34	45	41	55	0.2206	-0.0944	0.307
10	VC	51	68	24	32	0.4095	0.1631	0.0549
11	AC	13	17	62	83	0.0551	0.2896	0.057
12	A	30	40	45	60	0.2902	0.1918	0.6329
13	VC	42	56	33	44	0.7815	0.1893	0.4722
14	AC	19	25	56	75	0.4492	0.3851	0.2379
15	A	42	56	33	44	0.3453	0.1951	0.5408
16	VC	13	17	62	83	0.2728	0.0676	0.1841
17	AC	45	60	30	40	0.2737	0.6485	0.3534
18	A	37	49	38	51	0.4573	0.2308	0.6145
19	VC	27	36	48	64	0.6818	0.3363	0.5378
20	AC	20	27	55	73	0.0626	0.5277	-0.0678
21	A	49	65	26	35	0.2615	0.2653	0.3816
22	VC	42	56	33	44	0.5502	0.1771	0.3494
23	AC	13	17	62	83	0.1093	0.4205	0.0702
24	A	30	40	45	60	-0.0622	0.1468	0.2494
25	VC	23	31	52	69	0.4385	0.3313	0.3633
26	AC	12	16	63	84	0.1892	0.4569	0.3095
27	A	43	57	32	43	0.1824	0.1034	0.3267
28	A	13	17	62	83	0.03	0.3639	0.1767
29	VC	32	43	43	57	0.578	0.3369	0.5204
30	A	30	40	45	60	0.2229	0.2179	0.208

Subscales Attitudes: A - Affect.AC - Actual Commitment.

C- Verbal Commitment.

For the control group, item number 3 does not fit under the 'affect' category and item number 14 does not fit under the 'actual commitment' category. All the other items were distributed appropriately under the categories of verbal commitment, actual commitment, and affect.

Table 6 Non-parametric Correlation Test for the Non-Israeli Subjects Who completed the Who Completed the Course Curriculum. (Non-Israeli Treatment Group).

Questions	Scale	TRUE	% Of Total	FALSE	% Of Total	Spearman Correlation Coefficients		
						Verbal	Actual	Affect
1	VC	50	61	32	39	0.1757	0.2055	0.1837
2	AC	69	84	13	16	-0.0633	0.3288	-0.1148
3	A	54	66	28	34	0.2073	0.2036	0.438
4	VC	39	47	43	53	0.5606	0.2808	0.1948
5	AC	16	20	66	80	0.1168	0.3414	-0.169
6	A	62	76	20	24	0.1885	0.1888	0.5007
7	VC	75	91	7	9	0.3603	0.0281	0.2123
8	AC	62	76	20	24	0.0614	0.2986	-0.006
9	A	24	29	58	71	0.063	0.1127	0.3841
10	VC	64	78	18	22	0.1562	-0.0032	0.284
11	AC	42	51	40	49	0.3422	0.7393	0.4233
12	A	64	78	18	22	0.3932	0.4021	0.6158
13	VC	44	54	38	46	0.5783	0.0635	0.0381
14	AC	32	39	50	61	0.1164	0.3058	0.1383
15	A	76	93	6	7	0.0858	-0.0432	0.2915
16	VC	56	68	26	32	0.4791	0.2868	0.3473
17	AC	52	63	30	37	0.1452	0.5775	0.2457
18	A	12	15	70	85	0.0513	0.1525	0.3483
19	VC	22	27	60	73	0.3821	1.63	0.3879
20	AC	20	24	62	76	0.3477	0.6337	0.1129
21	A	3	4	79	96	0.1274	-0.1491	0.2906
22	VC	59	72	23	28	0.4143	0.1975	0.2259
23	AC	29	35	53	65	0.2936	0.4285	0.2029
24	A	27	33	55	67	0.2859	0.2211	0.5598
25	VC	38	46	44	54	0.5051	0.3227	0.1078
26	AC	35	43	47	57	0.4645	0.6338	0.2835
27	A	71	87	11	13	-0.1123	-0.2191	0.2789
28	A	62	76	20	24	0.2296	0.0667	0.0857
29	VC	17	21	65	79	0.1137	0.1953	0.2656
30	A	53	65	29	35	0.4069	0.2397	0.1781

Subscales Attitudes: A - Affect.AC - Actual Commitment. C- Verbal Commitment.

Table 7 t-test (Actual)

NON ISRAELI	ISRAELI		t-Test: Paired Two Sample for Means		
Actual	Actual				
0.2055	0.3062		<i>NON ISRAELI</i>	ISRAELI	
0.3288	0.2808		0.289006667	0.280426667	Mean
0.2036	0.1165		0.112846061	0.022767868	Variance
0.2808	0.2554		30	30	Observations
0.3414	0.2095			0.156291617	Pearson Correlation
0.1888	0.2145			0	Hypothesized Mean Difference
0.0281	0.3354			29	df
0.2986	0.4997			-0.135792056	t Stat
0.1127	0.0136			0.44646195	P(T<=t) one-tail
-0.0032	0.2126			0	t Critical one-tail
0.7393	0.5067			0.892923899	P(T<=t) two-tail
0.4021	0.0567			0.683043861	t Critical two-tail
0.0635	0.2454				
0.3058	0.4259				
-0.0432	0.4032				
0.2868	0.1863				
0.5775	0.4207				
0.1525	0.3059				
1.63	0.3319				
0.6337	0.4343				
-0.1491	0.3258				
0.1975	0.3761				
0.4285	0.5062				
0.2211	-0.0312				
0.3227	0.0635				
0.6338	0.2766				
-0.2191	0.3573				
0.0667	0.4045				
0.1953	0.3541				
0.2397	0.0187				

Table 8 t-test (Effect)

NON ISRAELI	ISRAELI		t-Test: Paired Two Sample for Means		
Affect	Affect				
0.1837	0.3307		<i>NON ISRAELI</i>	<i>ISRAELI</i>	
-0.1148	0.267		0.244523333	0.33012	Mean
0.438	0.16		0.032220265	0.040414962	Variance
0.1948	0.4058		30	30	Observations
-0.169	0.1754			0.24125413	Pearson Correlation
0.5007	0.6226			0	Hypothesized Mean Difference
0.2123	0.2965			29	df
-0.006	0.2037			1.995056901	t Stat
0.3841	0.2626			0.027754553	P(T<=t) one-tail
0.284	0.1544			0	t Critical one-tail
0.4233	0.2358			0.055509106	P(T<=t) two-tail
0.6158	0.509			0.683043861	t Critical two-tail
0.0381	0.3927				
0.1383	0.2697				
0.2915	0.62				
0.3473	0.1865				
0.2457	0.385				
0.3483	0.6161				
0.3879	0.3962				
0.1129	0.012				
0.2906	0.5746				
0.2259	0.5809				
0.2029	0.2979				
0.5598	0.2569				
0.1078	0.1873				
0.2835	-0.2227				
0.2789	0.5881				
0.0857	0.4657				
0.2656	0.5461				
0.1781	0.1271				

Table 9 t-test (Verbal)

NON ISRAELI	ISRAELI				
Verbal	Verbal		t-Test: Paired Two Sample for Means		
0.1757	0.4059				
-0.0633	0.0769		<i>NON ISRAELI</i>	ISRAELI	
0.2073	0.1773		0.249216667	0.347386667	Mean
0.5606	0.5637		0.033024222	0.041225141	Variance
0.1168	-0.1402		30	30	Observations
0.1885	0.2913			0.28177372	Pearson Correlation
0.3603	0.5432			0	Hypothesized Mean Difference
0.0614	0.2472			29	df
0.063	0.1098			2.325636295	t Stat
0.1562	0.3827			0.013618233	P(T<=t) one-tail
0.3422	0.3891			0	t Critical one-tail
0.3932	0.216			0.027236467	P(T<=t) two-tail
0.5783	0.5713			0.683043861	t Critical two-tail
0.1164	0.3294				
0.0858	0.5888				
0.4791	0.5324				
0.1452	0.2484				
0.0513	0.6002				
0.3821	0.5219				
0.3477	0.2168				
0.1274	0.237				
0.4143	0.6754				
0.2936	0.3071				
0.2859	0.0765				
0.5051	0.4975				
0.4645	0.0529				
-0.1123	0.3735				
0.2296	0.4926				
0.1137	0.6149				
0.4069	0.2221				

Table 10 Non-parametric Correlation Test for the Non-Israeli Subjects Who did not complete the Who Completed the Course Curriculum. (Non-Israeli Control Group)

Questions	Scale	TRUE	% Of	FALSE	% Of	Spearman Correlation Coefficients		
						Verbal	Actual	Affect
1	VC	46	55	38	45	0.4516	0.2081	-0.067
2	AC	8	10	76	90	0.0697	0.0347	-0.1207
3	A	32	38	52	62	0.0293	-0.0128	0.3145
4	VC	46	55	38	45	0.3464	0.1093	0.0928
5	AC	76	90	8	10	0.0612	0.3884	-0.0617
6	A	20	24	64	76	0.1294	0.1301	0.3992
7	VC	5	6	79	94	0.3237	0.2016	0.2307
8	AC	22	26	62	74	-0.076	0.2695	0.1946
9	A	62	74	22	26	0.1265	0.1509	0.4536
10	VC	19	23	65	77	0.3023	0.2102	0.0533
11	AC	32	38	52	62	0.2605	0.5791	0.1259
12	A	11	13	73	87	0.332	0.4853	0.5204
13	VC	33	39	51	61	0.541	0.1139	0.2681
14	AC	47	56	37	44	0.2658	0.5674	0.1554
15	A	1	1	83	99	0.1173	0.1237	0.2008
16	VC	26	31	58	69	0.4727	0.1521	0.0999
17	AC	36	43	48	57	0.1129	0.4523	0.3706
18	A	73	87	11	13	0.0414	0.1303	0.2831
19	VC	73	87	11	13	0.4319	0.268	0.4838
20	AC	58	69	26	31	0.0648	0.5938	0.1532
21	A	80	95	4	5	0.2694	0.1761	0.3943
22	VC	24	29	60	71	0.4307	-0.1677	0.0128
23	AC	35	42	49	58	0.1124	0.5873	0.2291
24	A	62	74	22	26	0.3705	0.3497	0.7132
25	VC	36	43	48	57	0.5853	0.2234	0.1448
26	AC	47	56	37	44	0.3854	0.586	0.3784
27	A	9	11	75	89	-0.0799	0.0145	0.1179
28	A	17	20	6	80	0.1186	0.1298	0.1169
29		74	88	10	12	0.2041	0.1772	0.3217
30	A	36	43	48	57	0.1139	0.0934	0.1469

Tables 5 and 6 presents the non-parametric correlation for the Non-Israeli Treatment and Control Subjects. Items number 1 and 19 do not fit under the “verbal commitment” category in the non-Israeli treatment group. All the other items are distributed appropriately under the categories of verbal commitment, actual commitment, and affect. Item number 2 **does not fit** under the “actual commitment” category, and item number 19 **does not fit** under the “verbal commitment” category for the non-Israeli control group. All other items are distributed appropriately under the categories of verbal commitment, actual commitment, and affect. Consequently, the subscales have reasonable internal validity.

6.2. Testing the Research Hypotheses:

The research hypotheses of the study were evaluated using t-tests for independent samples. To control type one errors, $p < 0.05$ was chosen for the research. Twelve null hypotheses were tested for four research hypotheses which decreased the critical p value to $p < 0.004$

$$(p < 0.05 / 12 = p < 0.004).$$

The first hypothesis: non-Israeli participants who participated in the Program did not have significantly more positive attitudes environmental issues than Israeli participants.

T-tests were run to test three null hypotheses:

A. H0. Participants from Developed Countries, who completed the Program: "Water is the essence of life " project, did not have significantly more positive verbal commitment attitudes toward the water- related environmental issues than teachers who completed the same program.

The t-test for independent samples of Treatment (Table7) reported that the verbal commitment means for the non-Israeli group (N=82) was equal to 5.18; for the Israeli group (N=71) the mean was 4.77.

For the two groups of participants (Non-Israeli and Israeli participants), the mean difference was 0.4083, $F=9.143$, $p=0.003$, t-value was 1.28, and 2-tail significance was 0.204. The H0 that there was no difference between the two groups of participants in the two treatment groups in terms of verbal commitment scale is accepted.

Table 11 T-Test for Independent Samples of TREATMENT Subjects for Israeli and Non-Israeli participants Who Completed the Course Curriculum.

Variable	Number of Cases	Mean	SD	SE of Mean	t-value	df	2-tail Significance
Verbal Commitment							
Non-Israeli	84	5.1829	1.708	0.189			
Israeli	84	4.7746	2.179	0.259	1.28	131.99	0.204
Mean Difference = .4083							
Levene's Test for Equality of Variances: F = 9.143, P = .003							
Non-Israeli	84	3.622	2.047	0.226			
Israeli	84	2.3803	1.418	0.168	4.41	144.36	<0.00001
Mean Difference = 1.2417							
Non-Israeli	84	7.1585	1.543	0.17			
Israeli	71	5.4085	2.032	0.241	5.93	129.46	<0.00001
Mean Difference = 1.7501							
Levene's Test for Equality of Variances: F = 9.719, P = .002							
Non-Israeli	84	18.122	4.432	0.489			
Israeli	84	13.8451	5.434	0.645	5.28	135.11	<0.00001
Mean Difference = 4.2769							

Participants	verbal commitment	actual commitment	affect commitment	total
Non-Israeli	5.1829	3.622	7.1585	18.122
Israeli	4.7746	2.3803	5.4085	13.8451

B. H0: teachers (Non-Israeli and Israeli participants), who completed the program “Water is essence of life “have significantly more positive attitudes toward the water- related environmental issues than others who didn’t participate in this program.

For actual commitment, the t-test for independent samples reports that the mean for the non-Israeli group (N=82) was 3.6220, and for the Israeli group (N=71) the mean was 2.3803. For the two groups (Non-Israeli and Israeli teachers), the mean difference was 1.2417, $F=7.964$, $p=0.005$.

t-value was 4.41, and 2-tail significance was <0.00001 . There is a significant difference between the (Non-Israeli and Israeli participants) treatment group in actual commitment scale, in favor of the non-Israeli participants. The H0 that there was no difference between the two groups in terms of actual commitment scale was rejected. There was a significant difference between (Non-Israeli and Israeli participants) treatment group in affect scale in favor of the non-Israeli participants.

The H0 that there was no difference between the two groups of participants in terms of affect scale was rejected. Finally, for the total number of items (1-30) in response on the first research hypothesis, the non-Israeli group (N= 82) had a mean of 18.1220. and the Israeli group’s (N= 71) mean was 13. 8451. For the two groups (Non-Israeli and Israeli participants), the mean difference was 4.2769, $F=4.882$, $p=0.029$. t-value was 5.93, and 2-tail significance was <0.00001 . There was a significant difference between (Non-Israeli and Israeli teachers) groups in total number of items in the Survey of Environmental Attitudes. The first research hypothesis that there was no difference between the two groups of Non-Israeli and Israeli teachers was not confirmed.

Table 12 T-Test for Independent Samples of CONTROL Subjects for (Non-Israeli and Israeli participants) Who DID NOT Complete the Program: "Water is the essence of life".

Variable	Number of Cases	Mean	SD	SE of Mean	t-value	df	2-tail Significance
Verbal Commitment							
Non-Israeli	18	3.285	1.739	0.19	-2.87	145.37	0.005
Israeli	26	4.16	2.067	0.239			
Mean Difference =0 .8743 Levene's Test for Equality of Variances: F = 3.268, P = .073							
Actual Commitment							
Non-Israeli	18	5.1429	1.915	0.209	11.01	155.11	<0.00001
Israeli	26	2.1333	1.528	0.176			
Mean Difference = 3.0095 Levene's Test for Equality of Variances: F = 7.505, P =0 .007							
Affect							
Non-Israeli	18	1.5714	1.228	0.146	-12.71	132.57	<0.00001
Israeli	26	4.88	1.867	0.216			
Mean Difference =-3.3086 Levene's Test for Equality of Variances: F = 8.391, P =0 .004							
TOTAL							
Non-Israeli	18	10.75	4.118	0.449	-2.15	142.7	0.034
Israeli	26	12.3333	5.071	0.586			
Mean Difference = -1.5833 Levene's Test for Equality of Variances: F = 3.063, P =0 .082							

Participants in the treatment group (Non-Israeli and Israeli participants) showed significant differences in affect scale in favor of non-Israeli participants. The H0 that there was no difference between the two groups of participants in terms of affect scale was rejected.

Finally, for the total number of items (1-30) in response on the first research hypothesis, the non-Israeli group (N=18) had a mean of 10.75 and the Israeli group's (N=26) mean was 12.33.

For the two groups of participants (Israeli and Non-Israeli), the mean difference was -1.5833, $F=3.063$, $p=0.082$, t-value was -2.15, and 2-tail significance was 0.034. There was no significant difference between the Israeli and Non-Israeli participants in the control groups. The second research hypothesis that there was no difference between the two groups of participants was not confirmed.

Table 12 presents the results of the chi-square test for the Israeli and Non-Israeli control group of subjects. Significant differences were found in items 7, 13, 19, 22 in favor of the Israeli group, and in items 10 & 16 in favor of non-Israeli group of subjects.

6.3. Summary

The data collected from the Survey of Environmental Attitudes were analyzed using multiple t-tests for independent samples. **A significant difference** was found between the Non-Israeli and Israeli subjects who completed the program - "Water is the essence of life " curriculum in favor of the

Non-Israeli subjects; between the Non-Israeli and Israeli subjects who did not complete the program: "Water is the essence of life. " Curriculum in favor of the Israeli subjects; and between the non-Israeli subjects who did and did not complete curriculum in favor of the treatment group.

No difference was found between Non-Israeli and Israeli subjects - treatment and control groups.

7. Chi-Square (χ^2) Analysis:

Tests of the four hypotheses resulted significant differences in all the subscales, although differences were not consistent across all comparisons. To examine the differences within subscales, chi-square tests were used to examine individual items. Chi-square tests are appropriate for nominal or ordinal data and are appropriate for the examination of individual items. Significance was established as p level of 0.05. The results of these tests are presented in Tables 11-20.

7.1 Chi-Square Analysis for Verbal Commitment Subscale

A significant difference in the verbal commitment subscale was found between the Israeli and Non-Israeli control groups of subjects (Tables 11 and 12) and between the non-Israeli treatment and control groups of subjects (Table 13 and 14).

Table 13 Chi-Square Analysis for the Verbal Commitment Subscale for the Israeli and Non-Israeli Subjects who did not Complete the course.

Item	Mean		Chi-Square	Significance
	Israeli Control	Non-Israeli Control		
1	0.573	0.452	2.31946	0.12776
4	0.307	0.452	3.55784	0.05926
7	0.72	0.06	74.06278	<0.00001
10	0.32	0.774	33.11287	<0.00001
13	0.56	0.399	4.44194	0.03507
16	0.173	0.31	3.96995	0.04632
19	0.64	0.131	43.99492	<0.00001
22	0.56	0.286	12.277	0.00046
25	0.307	0.429	2.52306	0.11219

The results of significance of individual items for the verbal commitment subscale between the Israeli and Non-Israeli control groups of subjects are presented in Table 13. Israeli subjects did significantly better in response to both personal items as well

as one customer/economic item and the value of water item. Non-Israeli subjects did significantly better in response to both governmental items.

Table 14 Significance in Responses for the Verbal Commitment Items on Israeli and Non-Israeli Control Group of Subjects.

Item Number	Category	Item	Significance
7	Personal	During water shortages, I will use less water when bathing.	Israeli
10	Governmental	I am not willing to elect a governmental representative who doesn't advance environmental justice.	Non-Israeli
13	Consumer/ Economic	I would be willing to stop purchasing products from companies that pollute rivers, even if I had to inconvenience myself.	Non-Israeli
16	Governmental	I would be willing to write my representative in the municipality weekly concerning the need for increased restrictions on industrial chemicals released to waterways.	Non-Israeli
19	Value of Water	I am willing to do much about water conservation because shortage of water is available.	Israeli
22	Personal	I would be willing to encourage my parents to use less lawn fertilizer.	Israeli

7.2. Chi-Square Analysis for Actual Commitment Subscale :

A significant difference in the actual commitment subscale were found between the Israeli and Non-Israeli treatment (Tables 14 and 15) and control (Tables 16 and 17) groups of subjects.

Table 14 presents the results of the chi-square test for the Israeli and Non-Israeli treatment groups of subjects. Differences were found in items: 2,8,11,23,26(in favor for Non-Israeli Group) and item 14 in favor for Israeli Group.

Table 15 Chi-Square Analysis for the Actual Commitment Subscale for the Israeli and Non-Israeli Subjects Who Completed the course.

Item	Mean		Chi-Square	Significance
	Israeli Control	Treatment Non-Israeli Treatment Control		
2	0.056	0.159	4.02407	0.04486
5	0.183	0.195	0.03581	0.84991
8	0.197	0.744	45.51312	<0.00001
11	0.254	0.524	11.64568	0.00064
14	0.775	0.61	4.80542	0.02837
17	0.479	0.366	1.99757	0.15755
20	0.14	0.24	2.56387	0.10933
23	0.127	0.354	10.49406	0.0012
26	0.17	0.429	11.88439	0.00057

Table 16 Significance in Responses for the Actual Commitment Items on Israeli and Non-Israeli Subjects Who Completed the Course

Item Number	Category	Item	Significance
2	Governmental	My neighborhood has experienced water pollution problems, but I have never contacted a governmental representative about them.	Non-Israeli
8	Personal	I avoid making paths across grassy areas because I know it increases soil erosion.	Non-Israeli
11	Value of Water	I talk to my family and peers about the limited availability of clean water.	Non-Israeli
14	Personal	It has never occurred to me to turn off the water in the sink while brushing my teeth in order to conserve water.	Israeli
23	Consumer/ Economic	I will continue to participate in the Globe Projects to enter scientific measurements concerning the quality of water resources.	Non-Israeli
26	Governmental	I have followed the government's efforts to settle disputes (such as that between Israel and Lebanon) regarding water rights.	Israeli

Table 17 presents the results of the chi-square test for the Non-Israeli and Israeli control groups of subjects. Differences were found in items: 2,5,8,17,20,23(in favor for Non-Israeli Group) and item 14 in favor for Israeli Group.

Table 17 Chi-Square Analysis for the Actual Commitment Subscale for the Israeli and Non-Israeli Subjects who DID NOT Complete the Course.

Item	Mean		Chi-Square	Significance
	Israeli Control	Non-Israeli Control		
2	0.066	0.908	112.356	<0.00001
5	0.051	0.908	114.3921	<0.00001
8	0.093	0.263	7.56	0.006 0.00372
11	0.169	0.380	8.425	0.00009
14	0.751	0.44	15.401	0.03089
17	0.41	0.570	4.65934	<0.00001
20	0.277	0.70	28.4834	0.0005
23	0.183	0.439	12.11	<0.00001
26	0.16	0.57	27.10	

*Table 18 Significance in Responses for the **Actual Commitment Items** on Israeli and Non-Israeli who Completed the Course*

Item Number	Category	Item	Significance
2	Governmental	My neighborhood has experienced water pollution problems, but I have never contacted a governmental representative about them.	Non-Israeli
5	Community	My concern about water pollution has prompted me to contact a community agency.	Non-Israeli
8	Personal	I avoid making paths across grassy areas because I know that it increases soil erosion.	Non-Israeli
11	Value of Water	I talk to my family and peers about the limited availability of clean water.	Non-Israeli
14	Personal	The water in my sink is never turned off during brushing my teeth because I want to conserve it.	Israeli
17	Community	I have never paid attention to how the community's land is used and the impact its use has on water availability.	Non-Israeli
20	Consumer/ Economic	I have donated some of my allowance or earnings to alleviate losses due to floods or droughts.	Non-Israeli
23	Consumer/ Economic	I contribute funds to environmental groups concerned with protecting the quality of water supplies.	Non-Israeli
26	Governmental	I have followed the government's efforts to settle disputes (such as that between Israel and Non-Israeli) regarding water rights.	Non-Israeli

Table 18 presents the results of the chi-square test for the Israeli and Non-Israeli Subjects treatment groups of subjects. Differences were found in items: 3,6,12,15,21,27 (in favor for Non-Israeli Group).

*Table 19 Chi-Square Analysis for the **Affect Subscale** for the Israeli and Non-Israeli Subjects Who **Completed** the Course “Water is the essence of life ”.*

Item	Mean		Chi-Square	Significance
	ISRAELI Control	Treatment NON-ISRAELI Treatment Control		
3	0.255	0.66	3.97746	0.04610
6	0.591	0.75	4.01476	0.0453
9	0.587	0.707	2.80953	0.09372
12	0.544	0.78	10.30161	0.00133
15	0.55	0.93	29.05315	<0.00001
18	0.77	0.864	2.153	0.14375
21	0.38	0.962	60.79881	<0.00001
24	0.521	0.672	3.55253	0.05895
27	0.70	0.864	5.9664	0.01526

Table 20 *Significance in Responses for the **Affect Items** on Israeli and Non-Israeli who Completed the Course: "Water is the essence of life."*

Item Number	Category	Item	Significance
3	Consumer/ Economic	I am happy that removal of harmful chemicals is factored into the cost of drinking water.	Non-Israeli
6	Governmental	It infuriates me to read about government indifference to protect natural areas.	Non-Israeli
12	Value of Water	Running out of water is a concern for me.	Non-Israeli
15	Governmental	I get frustrated and angry when I think about how industries pollute.	Non-Israeli
21	Community	I rarely worry about the effects of water pollution on my community.	Non-Israeli
27	Community	It pleased me that communities evaluate the impact of increased population on the availability of water supplied.	Non-Israeli

The Non-Israeli subjects did significantly better in response to both governmental items and community items, and in one of the values of water item and consumer/economic item.

Table 20 presents the results of the chi-square test for the Israeli and Non-Israeli control groups of subjects. Differences were found in nine items from the Affect subscale. (In favor for Israeli Group).

*Table 21 Chi-Square Analysis for the **Affect Subscale** for the Israeli and Non-Israeli Subjects who **DID NOT Complete** the course.*

Item	Mean		Chi-Square	Significance
	Israeli Control	Treatment Non-Israeli Treatment Control		
3	0.817	0.381	32.56939	<0.00001
6	0.53	0.239	13.49244	0.00045
9	0.55	0.272	13.442	0.00025
12	0.39	0.133	14.9882	0.00011
15	0.55	0.012	60.33761	<0.00001
18	0.508	0.128	26.2499	<0.00001
21	0.357	0.047	23.15768	<0.00001
24	0.62	0.27	18.57604	0.00002
27	0.575	0.108	39.1307	<0.00001

*Table 22 Significance in Responses for the **Actual Commitment** Items on Israeli and Non-Israeli who **Completed** the Course.*

Item Number	Category	Item	Significance
3	Consumer/ Economic	I am happy that removal of harmful chemicals is factored into the cost of drinking water.	Israeli
6	All Citizens' responsibility.	I feel indifferent to the statement: "People need to consider the cost to the environment in everything they do and object they purchase."	Israeli
12	Value of Water	Running out of water is a concern for me.	Israeli
15	Governmental	When I think of the ways industries are polluting, I get frustrated and angry.	Israeli
21	Community	I rarely worry about the effects of water pollution on my community.	Israeli
27	Community	It pleased me that communities evaluate the impact of increased population on the availability of water supplied.	Israeli

The Israeli subjects did significantly better in response to both governmental items and community items, and in one of the values of water item, consumer/economic item, and all citizens' responsibility item.

7.3. Chi-Square Analysis Summary

Chi-Square analyses were presented for the verbal commitment, actual commitment, and affect subscales of the Survey of Environmental Attitudes. Significant differences were found between the Israeli and Non-Israeli control groups of subjects (four items in favor of the Israeli group and two items in favor of the non-Israeli group of subjects) for the verbal commitment subscale. Four items in favor of the treatment group and one in favor of the control group created significance between the treatment and control groups of the non-Israeli subjects for the verbal commitment subscale. For the actual commitment subscale, the non-Israeli treatment group of subjects did significantly better in responses to five items, while the Israeli group did better in response to one item. All nine items were found to be significantly different between the Israeli and Non-Israeli control group of subjects : eight of them in favor of the Non-Israeli subjects, and one in favor of the Israeli subjects, two items from the treatment group and four from the control group of the Non-Israeli subjects created significance between the Non-Israeli treatment and control groups of subjects .For the affect subscale, six items were significantly different in favor of the Non-Israeli group between Israeli and Non-Israeli control groups of subjects .All nine items were also found significantly in favor of the treatment group between the Non-Israeli treatment and the control groups of subjects.

7.4. Summary

The reviewed research indicates that attitudes are a learned response to attitude objects. A participant's affective and cognitive attitude components can be influenced by the course contents. Participant attitudes toward their local environment can be either positive or negative, so it is important to study each attitude deeply. In this study, the supported hypotheses demonstrate the connection between abstract cognitions and specific behaviors, a hierarchy of values-attitudes-intentions-behaviors. Values and intentions were not directly correlated, and attitudes and behaviors were also not directly correlated, so the predictive power of the model is greatly reduced when one variable is unmentioned from the chain of interrelated variables. For instance, it is important to evaluate the environmental and individual consequences associated with the product purchase before making a decision about whether to purchase an environmentally responsible product or one with an alternative that is not environmentally responsible. Another example, cloth diapers were more likely to be purchased by individuals who felt that disposable diapers had a negative environmental impact.

The intention to purchase disposable diapers was also more likely in those who considered individual consequences of using cloth diapers, such as limited sizes, convenience, fit, and absorbency. The formation of intention may be influenced by an evaluation of the consequences of the environment and the consequences of the individual. Due to the strong influence of the individual consequences, it is understandable that some consumers may be concerned about the environment but not act in an environmentally friendly manner.

Thus, the influence of positive environmental attitudes on intention are negated by the negative attitudes towards the individual consequences. The results are consistent with recent findings in studies investigating the relationship between inconvenience and recycling behavior (Dahab et al., 1995; McCarty and Shrum, 1994; Thøgersen and Grunert-Beckmann, 1997). An operationalized model is essential for research involving environmentally responsible behavior, which is underscored in this study. Many studies have found little correlation between attitudes and behavior regarding the environment, which makes sense given that attitudes and intentions are indirect, so that it is not surprising. The results support Bentler and Speckart's (1981) argument that a result of eliminating intention, causes to a required parsimonious model, but simpler than reality.

The Survey of Environmental Attitudes Results:

We have noticed that the Survey of Environmental Attitudes match three subscales of attitudes (verbal commitment, actual commitment, and affect) with four outcomes of the Course. The verbal commitment, actual commitment, and affect scales were presented in a true-false format (Maloney and Ward, 1993). Items for the three scales were randomly mixed in the survey.

Research Hypothesis 1

The first hypothesis: Participants from Non-Israeli Countries did not have significantly more positive attitude environmental issues than Israeli participants who participated in the same Project and Curriculum.

Statistical analysis of the results supported the rejection of this hypothesis as applied to the actual commitment subscale, affect subscale, and total scale.

In each case, the scores of non-Israeli participants were significantly higher (more positive) than the score of Israeli participants. No significant differences were found in the comparison of scores on the verbal commitment subscale.

Research Hypothesis 2

The second hypothesis: Participants from Non-Israeli Countries did not have complete in the Course curriculum did not have significantly more positive attitudes towards the water-related environmental issues than Israeli participants who also did not complete the same Project and Curriculum.

Statistical analysis of the results supported the rejection of this hypothesis as it applied to the actual commitment subscale and affect subscale.

Non-Israeli participants scored significantly higher on the actual commitment subscale, but Israeli participants scored significantly higher on the affect subscale. No significant differences were found on either the verbal commitment subscale or the total score.

Research Hypothesis 3

The third research hypothesis states that:

Participants from Non-Israeli Countries who completed the Course curriculum, possessed significantly more positive attitudes toward environmental issues than non-Israeli participants who did not complete the same Curriculum.

Statistical analysis of the results supported this hypothesis for the verbal commitment subscale, affect subscale, and for the total scores. For the actual commitment subscale, the non-Israeli participants who completed the Course curriculum,

presented significantly more positive attitudes than the non-Israeli participants who did not complete the Curriculum.

The fourth research hypothesis states that Israeli Participants who completed the Course curriculum, possessed significantly more positive attitudes toward the water-related environmental issues than Israeli participants who did not participate curriculum.

Statistical analysis of the results rejected the fourth hypothesis.

The Israeli participants who completed Course curriculum, did not present significantly different positive attitudes than Israeli Participants who did not complete the Curriculum on any of the subscales or on the total scores. Subscale scores for which significant differences were found using the t-test for independent samples were then examined using the chi-square test of independence with respect to individual items.

The goal here was to identify the specific items within each subscale that were primarily responsible for the differences found in subscale scores.

A significant difference in the verbal commitment subscale was found between:

1. Israeli and Non-Israeli control groups of subjects (Tables 11 and 12, – four items in favor of the Israeli group and two items in favor of the non-Israeli group of subjects.

A significant difference in the actual commitment subscale was found between

1. Israeli and Non-Israeli treatment groups of subjects (Tables13-14): – five items in favor of the non-Israeli subjects and one item in favor of the Israeli subjects.
2. Israeli and Non-Israeli Control groups of subjects (Tables15-16)

– six items in favor of the non-Israeli subjects and one item in favor of the Israeli subjects.

The two control groups (Non-Israeli and Israeli participants) showed significant differences on all nine items in the actual commitment subscale. The only item in which Israeli participants were more positive was one of two items that probed personal choices, the item that deal with not leaving the water running while the individual was brushing his teeth (item 14). On all other items students in non-Israeli control group were significantly more positive than students in the Israeli control group. Comparison between the two treatment groups showed the same differences on item 14 (conserving water while brushing your teeth) but the difference between Non-Israeli and Israeli scores had narrowed.

Finally, the analysis of treatment scores showed decrease from 8 items to 5 items that showed a significantly more positive response from the non-Israeli participants.

These five items (2, 8, 11, 23, and 26) were a mixed of items that reflected personal choices, engagement in government, and consumer choices.

A comparison between the non-Israeli participants who did and did not complete the curriculum showed significant differences in the actual commitment subscale for six of the nine items. Those who did complete the curriculum showed significantly higher scores on two items related to personal choice (items 8 and 14). Those who did not complete the curriculum showed significantly higher scores on items related to political choices (item 2, 5, and 17) as well as willingness to personal contribute funds to the financial loss due floods or droughts (item 20).

For the affect subscale, a significant difference was found between the following subjects:

1. Israeli and Non-Israeli treatment groups of subjects (Tables 17 and 18, six items in favor of the non-Israeli subjects.
2. Israeli and Non-Israeli control groups of subjects (Tables 19 and 20) – nine items in favor of the Israeli subjects.

The two control groups (Israeli and Non-Israeli) showed significant differences on all nine items on the affect subscale, with the students in Israeli showing significantly higher scores on all items.

After completion of the Project, only six of the nine items (3,6,12,15 ,21 and 27) showed significant differences; and all these six items from non-Israeli participants scored higher than Israeli participants.

Four of these items (6,15,21 & 27) reflected commitment to be involved politically, one item (12) reflected concern with running out water, and the last two items (3 & 18) demonstrated their enthusiasm about decisions that increased the cost of water but, in exchange, decreased the cost of water, and their participation in the course curriculum.

Participants' responses to the questions related to the Survey of Environmental Attitudes were very much correlated with the results of the t-tests and chi-square analysis. For example, question number 30 from the Survey of Environmental Attitudes: "I believe that an increased tax is the best way to encourage businesses and people to think more carefully about how they use water", had the same negative response from both Israeli and Non-Israeli participants.

Another example, question number 12 from the Survey of Environmental Attitudes “running out of water is a concern for me.”, had a negative response from Israeli subjects’, but a positive response from the non-Israeli subjects, which appears in the results of the chi-square test (Table 18).

8. Conclusions:

My introductory view of the relevant literature indicated various factors that might influence the way participants (Israeli and Non-participants) perceive their responsibility towards their local environment especially, after being exposed to environmental projects (Globe, Water is essence of life). A combination of factors, including student age, sociopolitical-economic-cultural values, school democratization, outdoor activities, and acquaintance with both the natural and built environments can lead to environmental citizenship.

In environmental education literature, environmental studies are often combined with civics education and awareness for the purpose of sustainable management as "environmental citizenship" or "sustainable citizenship. “.. In my research, I have investigated the differences in environmental attitudes between two Israeli and Non-Israeli who completed Environmental Curriculum were exposed to Project. Furthermore, I have compared the differences in environmental attitudes between participants who completed the course curriculum and participants who did not complete the Curriculum, controlling for the participants nationality. Yet, I have compared between the different / similar perceptions for environmental issues between Israeli participants and non-Israeli participants. When comparing the Israeli

and Non-Israeli participants, the Israeli participants' verbal commitment attitudes were more positive than the non-Israeli students' (for the treatment and control groups'), but not significantly. According to Lange, F., & Dewitte definition, there is a spectrum of existing approaches to the measurement of pro-environmental behavior, such as the verbal commitment scale is "...a scale, containing ten items, the measures what a person states he/she is willing to do in reference to water-related environmental issues".

Finally, non –Israeli participants in the control group scored significantly lower on the affect subscale ["...a scale, containing ten items that, measures the degree of an individual's emotionality related to environmental issues" (Maloney, Ward, R Braucht, 1975) than Israeli students in the control group.

Among those who completed the Curriculum, Non-Israeli participants on average scored significantly higher than Israeli participants. Among the Non-Israeli participants, the Curriculum clearly increased participants' emotional response especially to water-related environmental issues.

The differences in the level of participants' environmental knowledge are possibly related to the difference across all these subscales: verbal commitment, actual commitment, and affect. By contrast, most of the Israeli treatment and control groups were not part of environmental education classes, were not exposed to the project. In general, these participants did not change their attitudes toward environmental problems. There was no statistically significant difference in average scores between the treatment and control groups, although treatment scores were consistently higher than control scores. It seems likely that the differences between the Israeli and Non-Israeli science curricula explain this difference. As a matter of fact, my model describes

components of environmental responsibility that are interconnected with environmental literacy and citizenship. Clearly arise from in this research, it contains a very clear set of implications for practice: learners, teachers, and educational systems and environmental organizations need to become more aware of thinking skills and practical understandings of ecological systems in order to demonstrate increased environmental responsibility. This leads to a bigger influence on the community and on the agenda of policy makers and/or the general public.

Therefore, it is important to mention that the biophysical environment presents a number of problems that require various strategies to deal with. Because of this, it is crucial to cultivate citizens who are well-versed in the biophysical environment, aware of possible solutions, and actively involved in their solution.

8.1 Comparison of Non-Israeli and Israeli participants Concerns.

A Comparison of Non-Israeli and Israeli participants Concerns: Table Percentage of participant responses at the beginning and at the end of their course. The percentage each category comprises from total response.

Table 23 Comparison of Non-Israeli and Israeli participants Concerns

Themes	Categories	Course Beginning (%)	End of the course (%)
Environment as an ecosystem Based on UNESCO (2016)	Biophysical Components	56.7	54.4
	Social Aspect	8.9	4.4
	Economical – political	7.1	7.0
Water quality	Impact of human activity on water resources	52.2	43.0
	Environmental protection	22.1	14.9
Human-nature relationship	Environmental Attitudes	2.1	0.7
	Man - Environment	15.9	16.1
	Man, and the environment are interdependent	4.2	5.7

Non-human nature is valued by people on a continuous basis, which can also be organized by value of nature. At one end of this continuum, the value of non-human nature is viewed from the anthropocentric, utilitarian perspective which is perceived in terms of human needs: 'everything around me that helps me live'; 'natural environment has use – it protects us and provides our many needs'. In the other end, a worldview which is eccentric is displayed: 'all conditions for human life and all life on earth', 'how we can live without damaging the environment'. Only few teachers explicitly articulated the value-of-nature theme (Table 23).

8.2 Comparison between educators at the beginning and towards the end of their studies.

The table 23 compares the categories and themes emerging from participants' texts at various points in their studies between educators and towards the end.

By examining the frequency of the various categories and themes, it is apparent that both beginners and advanced participants perceive the environment primarily in biophysical terms. There were no obvious differences between beginner and advanced participants in most categories. Environmental perception differed only in terms of protection, which decreased during the study and increased during the study. From a linguistic perspective, 60 percent of the answers consisted of lists of elements or characteristics of the environment, and the remaining 30 percent contained complete sentences. In both time points, both groups of participants perceive the environment primarily as an object and rarely as a relation.

Groups perceptions of the relationship between the environment and their perceptions were noted to differ significantly, as follows: among beginner students,

ESS (environment-selected subjects such as environmental studies, agriculture, geography, life sciences (termed ESS-major participants who identified the environment as mutual relationships between people and the environment)).

Figure 3 ESS - environment selected subjects; NESS - non environment selected subjects.

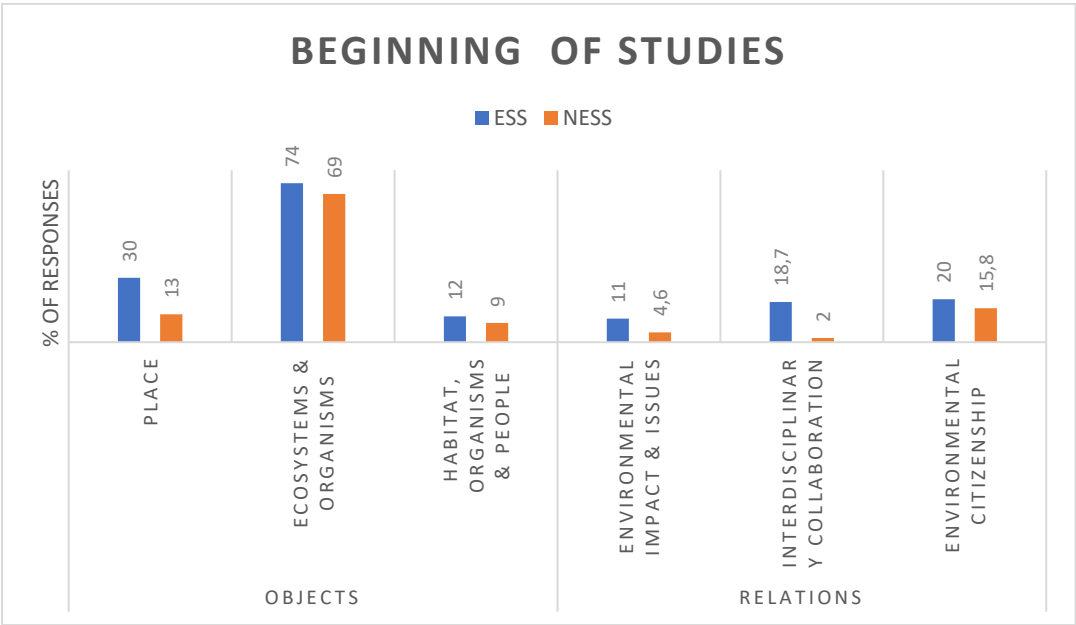
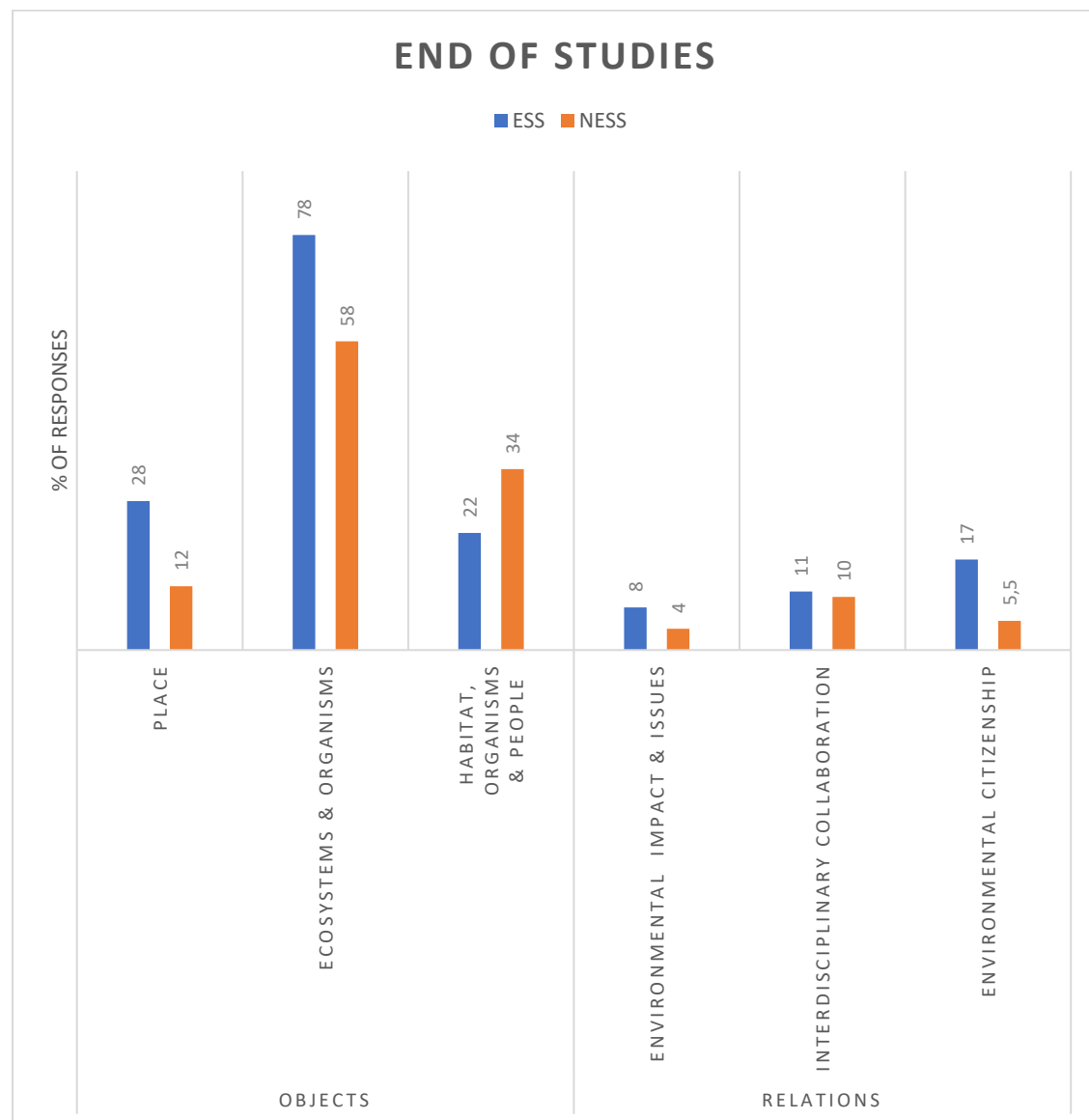


Figure 4 compares the categories and themes that emerged from teachers’ texts between teachers and the beginning and toward the end of their course.

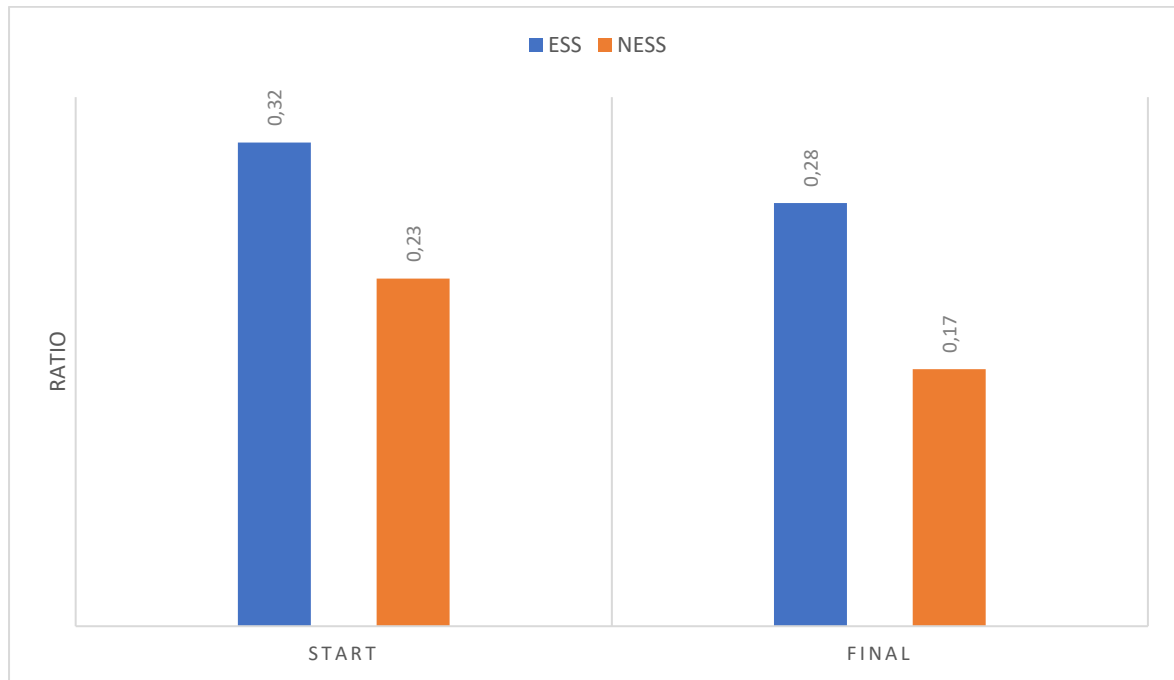
Both beginners and advanced teachers describe the environment predominantly in biophysical terms according to the analysis of the different categories and themes. For most categories, no prominent differences could be found between beginner and advanced teachers. In terms of interdisciplinary collaboration, only differences were found in perception of the environment, which decreased during their Course.

Figure 4 ESS - environment selected subjects; NESS - non environment selected subjects.



Distribution of ESS and NESS educators' responses (%) according to the categories described by Loughland, Reid, and Petocz (2002) at the beginning (a) and towards the end (b) of studies (N = 120).

Figure 5 ESS - environment selected subjects; NESS - non environment selected subjects

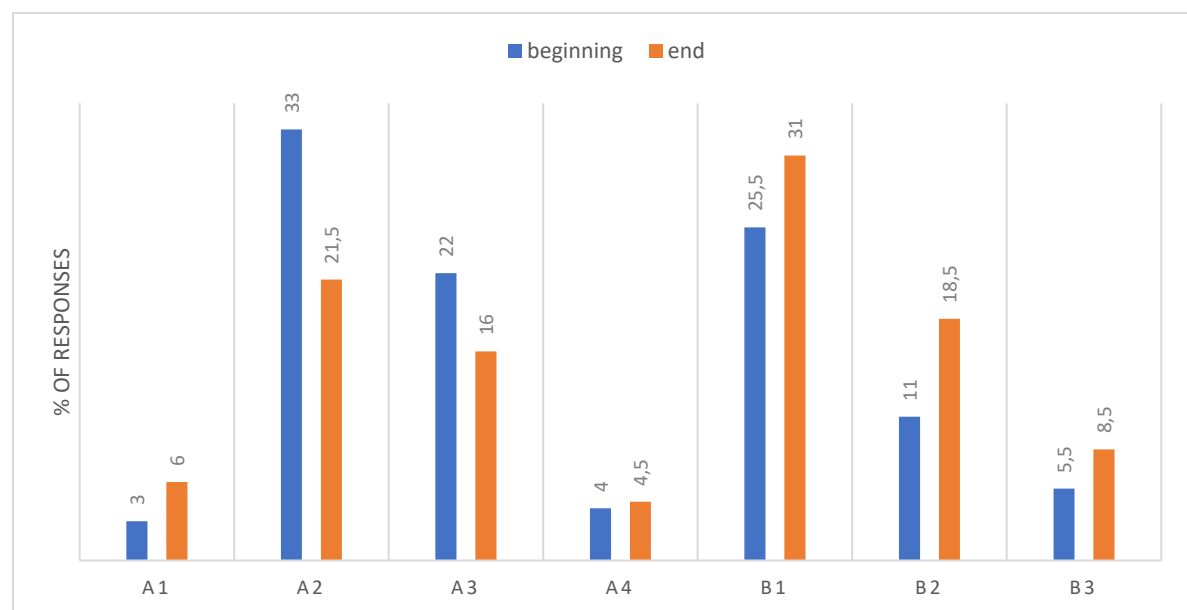


It should be mentioned that the low values of this ratio support the perception of the environment primarily as an object. Actually, at the beginning and towards the end of studies, the ratio between educators who perceive the environment as an object and educators who perceive it as an environment is different.

(ESS: N = 120; NESS: N = 80).

During the beginning of studies, there was no difference in this ratio between ESS and NESS educators, however, at the end of the program, the ratio was significantly higher for ESS.

Figure 6 A percentage of teachers' responses that addressed each of the rationalizations (subcategories) for relevance of the environment to their teaching disciplines.



A1 - Environment as a universal Challenge

A2 - Education for beliefs

A3 – Assignment as educators

A4 – Environmental Attitude

B1 - Environmental content (a framework to other disciplines)

B2 - Environmental values

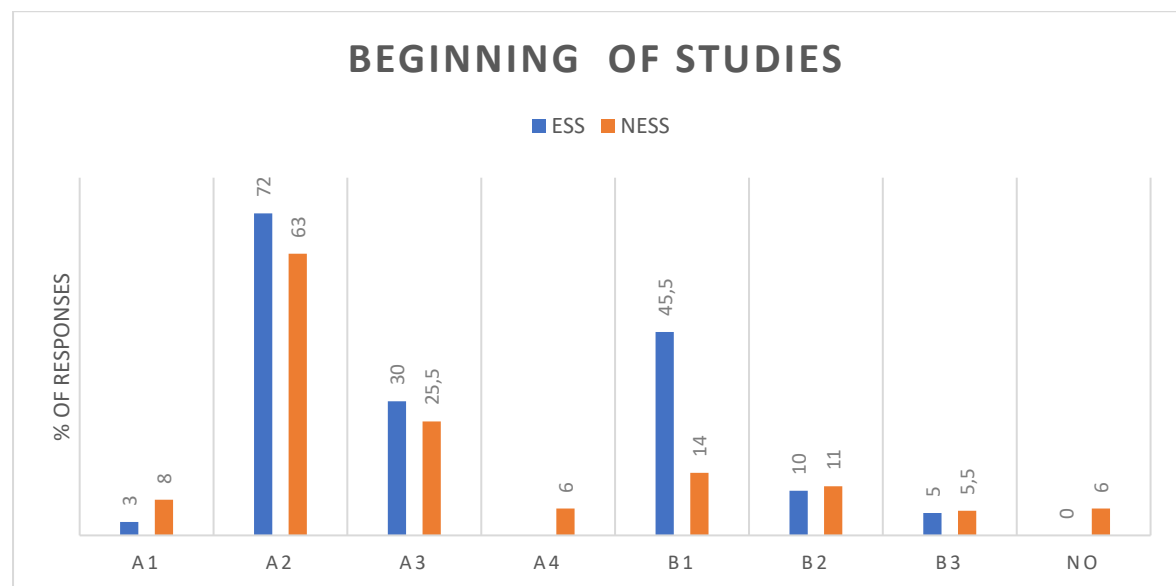
B3 - Environmental education pedagogy

NO - No Connection between environment theme & selected discipline.

Figure 6 presents the percentage of responses that addressed each of the rationalizations (subcategories) for relevance of the environment to the teachers' disciplines of teaching (educators at beginning of studies, N=120; teachers towards end of studies, N=80).

(Beginning of studies, N=120; towards end of Course N=80) and NESS (beginning of studies, N=120; towards end of Course, N=80) that addressed each of the rationalizations (sub-categories) for relevance of the environment to the teacher's disciplines.

Figure 7 The percentage of ESS teachers



Notes: Sum of categories is not 100% since educators' responses may include several categories.

A1 - Environment as a universal Challenge

A2 - Education for beliefs

A3 – Assignment as educators

A4 – Environmental Attitude

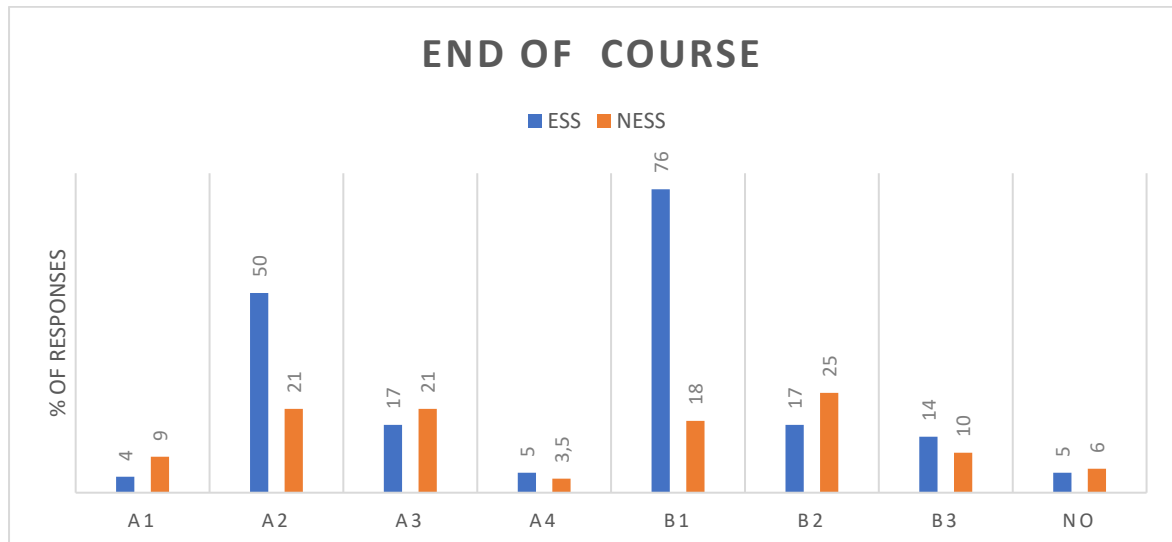
B1 - Environmental content (a framework to other disciplines)

B2 - Environmental values

B3 - Environmental education pedagogy

NO - No Connection between environment theme & selected discipline.

Figure 8 End of Course



A1 - Environment as a universal Challenge

A2 - Education for beliefs

A3 – Assignment as educators

A4 – Environmental Attitude

B1 - Environmental content (a framework to other disciplines)

B2 - Environmental values

B3 - Environmental education pedagogy

NO - No Connection between environment theme &selected discipline.

9. Conclusions and Scientific Novelty Of the research

One of the tools which was used in this part of the study was the multidimensional model described by UNESCO (2002,2007), which is based on the Sustainability Development Approach where it presents a framework for interpreting the findings relating to environmental education. The findings indicate two main points: first point emphasizes that the findings indicate two main points: first point emphasizes that the participants who haven't been exposed to environmental education didn't engage in social activities related to social welfare, public health, or environmental justice. Economic, political or cultural perspectives of the environment weren't mentioned as articulation of interactions among the different dimensions, it means they are only aware of the narrow sense of environment of its biophysical dimension. Second point was the distinction between perception of the environment-being a part of it and understanding the importance to reveal responsibility towards the environment. Israel, like other countries, is supporting implementation of EE within the school system (Babiuk and Falkenberg 2010; Ferreira et al. 2009; Ministry of Education 2011; Sleurs 2008). Considering these trends, preparing teachers who are equipped to educate their pupils towards sustainability in education becomes indispensable. Therefore, in the present study, same investigated student teacher population had limited involvement in environmentally responsible activities based on their perception of the environment in terms of environmental knowledge, environmental protection, attitudes, and behavior.

Only a few students expressed the understanding that human beings and/or their systems are inextricably linked to the environment.

According to their findings, the environment is viewed as an arena of conflict between nature and anthropocentric effects, which suggests that no clear understanding exists of its entire constituent components.

Despite this, they see the natural world and the environment as separate objects rather than interconnected systems including a relationship between people and nature. They write mostly descriptively about environments, not explanatorily or in relation to processes. Researchers have reported that these findings are similar to those reported for elementary and junior high school students (Loughland, Reid 2002; Shepardson 2005) and teacher students (Moseley, Desjean-Perrotta, and Utley 2010). Furthermore, it can be concluded that there is a basic understanding of the environment, and their professional preparation did not lead to significant developments in this area. Participants in this study tended to have a low level of environmental knowledge, in line with their incomplete understanding of the concept of environment.

Based on the results of this study, participants have defined an environment-associated view of their teaching area or knowledge primarily from a disciplinary perspective, which emphasizes content related to biology and ecology. By focusing on objective scientific knowledge, they illustrate the mechanistic and positivistic approach of the disciplines that they studied without developing a comprehensive, integrative understanding of the environmental issues. On the other hand, values are an integral part of public discourse, philosophical thought, pedagogy of education, and educational practice in societies and educational systems.

A crucial component of EE is the awareness of the importance of environmental issues. It was acknowledged by most participants that the environment plays an

important role in their future as educators is encouraging and motivates to a to work upon. Two effective milestones were suggested in teacher-education environmental program consequently to this case study findings.

First milestone: the necessity of using educational and pedagogical elements of teacher-education program as a for integrating EE. As part of the pedagogical component, there is a framework in different models in pedagogy for teaching environmental dilemmas in the classroom which are addressed in a practical way.

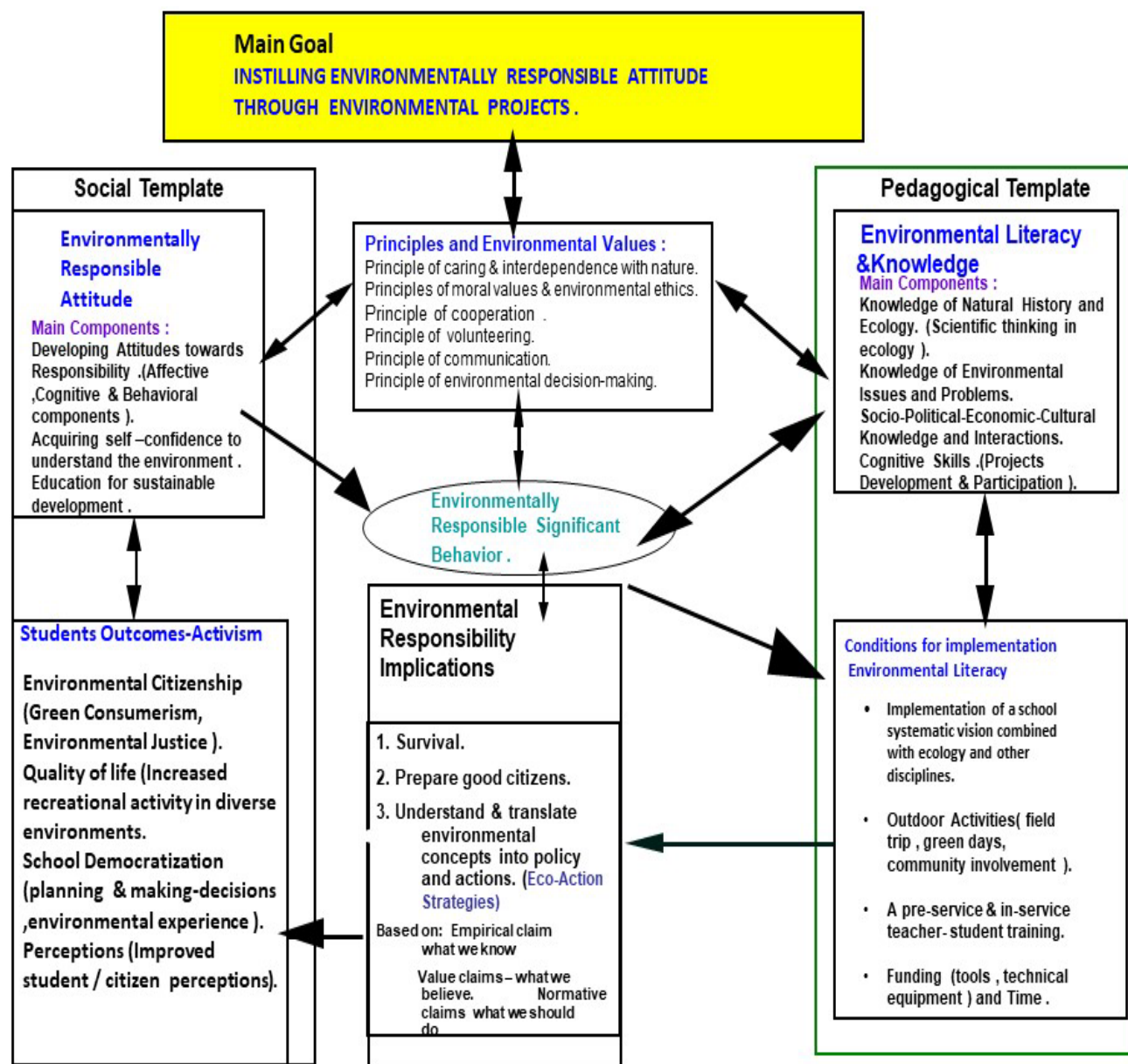
It is encouraging to see participants (both environment-affiliated and nonenvironmental affiliates) acknowledge subject matter as a basis for relevance toward the end of their studies, supporting the recommendation that teacher-preparation courses integrate environmental education into all subjects.

Second milestone: Participants should be more prepared to basic principles about environment where they could be exposed to concepts, principles and approaches associated with sustainability, aimed at developing a multi-dimensional perspective. Science education will benefit from such an approach. Furthermore, a common basis between environmental education and multicultural education is the key of valuing diversities. Multicultural education is deeply rooted in nurturing diversity, just as biodiversity is one of the most important concepts in environmental education. The educational process respects diversity on an individual and community level, from a local to a global scale in the field of environmental education and multicultural education.

During the course, participants were revealed to multicultural education, in order to find diverse world views, new innovations and solutions, and thus, to progress.

IX. The Proposed Model Concept

Figure 9 The Proposed Model Concept



In the proposed model, there are two main templates: pedagogical and social templates, both of which are based on the concept of environmental responsibility and environmental literacy including digital technologies.

Future generations will be able to provide the missing services that are vital to a better quality of life in a manner that maintains the integrity of the environment, encourages social equity, and fosters economic prosperity by providing the missing services.

Furthermore, it is noteworthy that alongside broad areas of knowledge (knowledge of issues, knowledge of actions, knowledge of cognitions) in relation to environmental education, the importance of values, ethics, attitudes, and behaviors in pedagogical conditions, thus giving a unique perspective which is not revealed in other disciplines. (Kamradt, T. F et al.1999). Additionally, by interacting with other participants, social learning also influences attitudes. Due to the fact that many people are eco-aware but do not control their pro-environmental behavior has led to a lack of action in support of the environment translated into actions. The use of digital games in the classroom to promote pro-environmental behavior can be an effective way to encourage students to become more environmentally aware.

However, it is not typical for educators to use games in their classrooms due to the time commitment and the inadequacy of devices for all students.

9.1 .Recommendations for Further Research

The results of this study recommend that further research be conducted to assess the impact of the Curriculum on a larger participants population from both Israeli and non-Israeli countries. We can notice specifically, that:

1. All the courses where the curriculum is offered have roughly the same content focus; i.e., human-nature relations, environmental quality.

2. Random samples of both participants can be assigned to the experimental and control groups.

The Non-Israeli participants who completed the Course Curriculum were all enrolled in environmental education classes and presented significantly more positive water-related environmental attitudes than Israeli participants, only 48 percent of whom were enrolled in environmental science classes. Specifically, do attitudes depend on a longer and more sweeping exposure to global environmental issues?

The course curriculum included activities that linked the science content related to Globe Project with the social, cultural and political context in which that knowledge is evaluated. Understanding whether such an approach can change the participants' willingness to become active participants in the social and political decision-making activities is important.

The Survey of Environmental Attitudes was based on three subscales – verbal commitment, actual commitment, and affect. Other attitudes related to environmental issues using different surveys of environmental attitudes (Schindler, 2011) might be helpful in characterizing the strengths of the Curriculum.

Participants' environmental attitudes and knowledge as related to global environmental concerns would also be a valuable area of research.

Positive responses from participants in the study were received about the program: "Water is the essence of life: ("... It is a very good program which helps students not only to see the world outside their own country, but also to change their opinion on many things they can see themselves". It is recommended to further support programs of international cooperation between Israel and other countries, especially those involved in joint curriculum development projects built around topics of common importance and interest.

One of the tools used in this study to analyze findings was the multidimensional model described by UNESCO, (2002). Since this model provides a suitable framework for interpreting findings related to EE due to the fact, it is based on the Sustainable Development approach. In the study of preservice teachers in Zimbabwe published by Van Petegem, Blieck, and Van Ongevalle (2007), it was found that most participants understood 'environment' in the narrow sense of its biophysical dimension.

Few considered the social dimension, and those that did focused primarily on family, friends, and social welfare rather than environmental justice, public health, and social welfare. In terms of articulation of interactions among different dimensions of the environment, economic and political perspectives were rare. (Table 28).

The fact indicates that teacher-education programs must reorient themselves toward the EE field in order to improve participants' understanding of the environment at the end of the course curriculum. In order to enrich the course curriculum contents, it would be useful to address global issues, as well as activities that could affect

environmental behavior and attitudes, based on case studies, audio, visual simulations especially in Covid-19 era. My main question is what should be the implications for environmental science education ?

In terms of culture and development level, the response to this question will differ from country to country.

What was very interesting that cultures put different meanings in the concept important and meaningful'. Every country's ecological, cultural, political, educational, and economic context should be taken into consideration by developing environmental science education programs. (UNESCO, 1980, 1985).

For instance, developing countries need to give environmental science education a different approach than developed countries, since environmental literacy varies from one country to another country.

These findings support the growing realization that ecology studies and EE are not the same thing (McKeown and Hopkins 2002; McKeown-Ice and Dedinger 2000; Van Petegem, Blicek, and Van Ongevalle 2007) and that in order to integrate environmental-social issues into future teaching, students must fully comprehend the complex issues in their daily lives. Teachers' involvement in environmental problems and their interest in environmental topics are the main issues in developed countries, so that it enhances teachers' concern for an involvement in environmental issues. one of the main goals of environmental science education which is essential to stimulate teachers and students in developed countries to visualize the future they would prefer, namely visualizing the alternatives and goals one wants to work towards, in order to empower them to act responsibly about the environmental issue.

Yet, the educational process should address questions such as their feelings, thoughts and even their responsibility to environmental issues in their countries globally comparing to their neighborhoods. Another recommended raised question is If the future were more sustainable, what would it look like? In order to achieve that, what actions could be taken?

What are the ways in which educators, students, and community members can implement their plans for action at school, at home, and in their communities?

On the other hand, those who have successfully completed the course curriculum in developing countries may have more positive attitudes toward environmental science education: future citizens should be better prepared to find ways to provide the services that are lacking in order to improve their quality of life in an environmentally sound, socially equitable, and economically affordable manner.

10 . Conclusiones y novedad científica de la investigación.

Una de las herramientas que se utilizó en esta parte del estudio fue el modelo multidimensional descrito por la UNESCO (2002,2007), el cual se basa en el Enfoque de Desarrollo Sostenible donde presenta un marco para interpretar los hallazgos relacionados con la educación ambiental. Los hallazgos indican dos puntos principales: el primer punto enfatiza que los participantes que no han estado expuestos a la educación ambiental no participaron en actividades sociales relacionadas con el bienestar social, la salud pública o el medio ambiente. justicia. Las perspectivas económicas, políticas o culturales del medio ambiente no fueron mencionadas como articulación de interacciones entre las diferentes dimensiones, es decir, sólo son

conscientes del sentido estrecho del medio ambiente en su dimensión biofísica. El segundo punto fue la distinción entre la percepción del medio ambiente, ser parte de él y comprender la importancia de revelar responsabilidad hacia el medio ambiente. Israel, al igual que otros países, apoya la implementación de la EE dentro del sistema escolar. (Babiuk and Falkenberg 2010; Ferreira et al. 2009; Ministry of Education 2011; Sleurs 2008). Teniendo en cuenta estas tendencias, resulta indispensable preparar docentes que estén preparados para educar a sus alumnos hacia la sostenibilidad en la educación. Por lo tanto, en el presente estudio, la misma población de estudiantes docentes investigados tenía una participación limitada en actividades ambientalmente responsables en función de su percepción del medio ambiente en términos de conocimiento ambiental, protección ambiental, actitudes y comportamiento. Sólo unos pocos estudiantes expresaron su comprensión de que los seres humanos y/o sus sistemas están inextricablemente vinculados al medio ambiente.

Según sus hallazgos, el medio ambiente es visto como un ámbito de conflicto entre la naturaleza y los efectos antropocéntricos, lo que sugiere que no existe una comprensión clara de todos sus componentes constitutivos.

A pesar de esto, ven el mundo natural y el medio ambiente como objetos separados en lugar de sistemas interconectados que incluyen una relación entre las personas y la naturaleza. Escriben principalmente de forma descriptiva sobre entornos, no explicativamente o en relación con procesos. Los investigadores han informado que estos hallazgos son similares a los reportados para estudiantes de primaria y secundaria Y profesores estudiantes. (Loughland, Reid 2002; Shepardson 2005) (Moseley, Desjean-Perrotta, and Utley 2010). Además, se puede concluir que existe

un conocimiento básico del medio ambiente, y su preparación profesional no condujo a avances significativos en este ámbito. Los participantes en este estudio tendían a tener un bajo nivel de conocimiento ambiental, en consonancia con su comprensión incompleta del concepto de medio ambiente.

Con base en los resultados de este estudio, los participantes han definido una visión asociada al medio ambiente de su área de enseñanza o conocimiento principalmente desde una perspectiva disciplinar, que enfatiza contenidos relacionados con la biología y la ecología. Al centrarse en el conocimiento científico objetivo, ilustran el enfoque mecanicista y positivista de las disciplinas que estudiaron sin desarrollar una comprensión integral e integradora de las cuestiones ambientales. Por otro lado, los valores son parte integral del discurso público, el pensamiento filosófico, la pedagogía de la educación y la práctica educativa en las sociedades y sistemas educativos.

Un componente crucial de la EE es la conciencia de la importancia de las cuestiones ambientales. La mayoría de los participantes reconocieron que el medio ambiente juega un papel importante en su futuro, ya que los educadores los alientan y motivan a trabajar en él. Como consecuencia de los hallazgos de este estudio de caso, se sugirieron dos hitos efectivos en el programa ambiental de formación docente. Primer hito: la necesidad de utilizar elementos educativos y pedagógicos del programa de formación docente como medio para integrar la EA. Como parte del componente pedagógico, se encuentra enmarcado en diferentes modelos en pedagogía para la enseñanza de dilemas ambientales en el aula los cuales se abordan de manera práctica. Es alentador ver que los participantes (tanto afiliados al medio ambiente como no ambientales) reconocen la materia como base de relevancia hacia el final de

sus estudios, apoyando la recomendación de que los cursos de preparación docente integren la educación ambiental en todas las materias.

Segundo hito: Los participantes deberían estar más preparados con los principios básicos sobre el medio ambiente donde podrían estar expuestos a conceptos, principios y enfoques asociados con la sostenibilidad, destinados a desarrollar una perspectiva multidimensional. La educación científica se beneficiará de este enfoque. Además, una base común entre la educación ambiental y la educación multicultural es la clave para valorar las diversidades. La educación multicultural está profundamente arraigada en el fomento de la diversidad, del mismo modo que la biodiversidad es uno de los conceptos más importantes en la educación ambiental. El proceso educativo respeta la diversidad a nivel individual y comunitario, desde la escala local hasta la global en el ámbito de la educación ambiental y la educación multicultural.

Durante el curso, los participantes se acercaron a la educación multicultural, con el fin de encontrar diversas visiones del mundo, nuevas innovaciones y soluciones, y así, progresar.

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12. Appendices

Appendix 1 :SURVEY OF ENVIRONMENTAL ATTITUDES

Please respond to the following items, circling the response – True or False -which best represents your feelings or actions.

Your responses will remain anonymous.

T F 1. (Verbal Commitment).

I will never participate in a community meeting devoted to deciding whether to build houses or locate industry in a floodplain.

T F 2. (Actual Commitment).

I have never been brought to my attention water pollution problems by a government representative.

T F 3. I am happy to raise the awareness among my friends to save water. (Affect Commitment).

T F 4. I would never join a group or club which is concerned solely with the impact that farming has on water pollution. (Verbal Commitment).

T F 5. I have reached a community agency to find out how I can deal with water pollution. (Actual Commitment).

T F 6. It genuinely infuriates me to read about the government indifference not to protect natural areas. (Affect Commitment).

T F 7. I am willing to use less water when I bathe during water shortages. (Verbal Commitment).

T F 8. I avoid making paths across grassy areas because I know that it increases soil erosion. (Actual Commitment).

T F 9. I feel indifferent to the statement: "People need to consider the cost to the environment in everything they do and object they purchase." (Affect Commitment).

T F 10. I am not willing to elect a governmental representative solely based on his or her position on water rights. (Verbal Commitment).

T F 11. I talk to my community and peers about the limited availability of clean water. (Actual Commitment).

T F 12. I am worried about running out of water. (Affect Commitment).

T F 13. I would might not be able to purchase products from companies that pollute rivers is not worth it to me even though it might be inconvenient. (Verbal Commitment).

T F 14. I have never turned off the water in the sink while brushing my teeth in order to conserve water. (Actual Commitment).

T F 15. When I think of the ways industries are polluting, I get frustrated and angry. (Affect Commitment).

T F 16. I would be willing to write to the Ministry of Environmental Protection or to a green company weekly concerning the need for increased restrictions on industrial chemicals released to waterways. (Verbal Commitment).

T F 17. I have never paid attention to how the community's land is used and the impact its use has on water availability. (Actual Commitment).

T F 18. The whole water pollution issue has never upset me since I when I've entered hydrology was involved in GLOBE Program data into the Globe website. (Affect Commitment).

T F 19. I am willing to do much about water conservation because shortage of water is available. (Verbal Commitment).

T F 20. I have donated some of my allowance or earnings to alleviate losses due to floods or droughts. (Actual Commitment).

T F 21. I rarely worry about the effects of water pollution on my community. (Affect Commitment).

T F 22. I would be willing to encourage my community to use less lawn fertilizer. (Verbal Commitment).

T F 23. I plan to continue to participate in the Globe Program entering scientific data concerning hydrology and comparing with other schools in the same latitude and longitude coordinates. (Actual Commitment).

T F 24. I feel indifferent to the impact meat-packing plants and agricultural irrigation is having on the level of the water table. (Affect Commitment).

T F 25. I would be willing to pay more for meat if meat packing plants were limited in the amount of water they could use from aquifers. (Verbal Commitment).

T F 26. I have followed the government's efforts to settle disputes (for example as that between Israel and Lebanon) regarding water rights. (Actual Commitment).

T F 27. It pleased me that communities evaluate the impact of increased population on the availability of water supplied. (Affect Commitment).

T F 28. I would volunteer once a week in a foundation that works to increase citizen awareness of environmental concerns. (Verbal Commitment).

T F 29. I see no point in getting involved with environmental issues. (Actual Commitment).

T F 30. I believe that increased water taxes are the best way to encourage businesses and people to think more carefully about how they use water. (Affect Commitment).

GOOD LUCK !!

Appendix 2 : Environmental studies topics:

The Topics	Number of Educational Units	Ordinary Level	High Level	Summative Evaluation
Definitions & Principles	2	+	+	Test External Evaluate
Environmental Workshop	1	+	+	Portfolio Evaluate Internal Exam
Environmental Specialty	1		+	Test External Evaluate
ECOTOPE (Environmental research)	1		+	Oral External Evaluate.

Subjects: Compulsory & Optional

The two main units in "the Definitions & Principles" and the fourth unit

" Specialty Unit ", are essential to present the main topics in the curriculum program which consist 7 subjects:

1. Ecological system and biological diversity. (Obligatory subject in both levels).
2. Water Resource.
3. Air Resource.
4. Noise & Radiation.
5. Environmental Conservation & Management.
6. Solid Waste Resources.
7. Environmental Ethics. (For high level students).

In Each subject, Scientific and Technological aspects are emphasized and " latitudinal subjects " Law & Environmental. Sentence, Public Health, Environmental Economy & Environmental Ethics.

Appendix 3 : Publication 1

Hamdan, F. Lara-Sánchez, AJ., Arufe-Giráldez, V. (2024). Long-term environmental awareness and attitudes among Israeli Junior High school students. *EDUCA : International Magazine For Educational Quality* (pending publication).

Abstract: At present, many countries have multiple problems related to environmental awareness and environmental care. In 2015, the United Nations General Assembly established through the 2030 Agenda a total of 17 Sustainable Development Goals to achieve a more sustainable future for all societies. Several of these are directly related to environmental education. The objective of this study is to know the impact of an excursion to promote care for the environment influences the development of environmental responsibility of students and to what extent. This article is a case-study about relationship between environmental ethics and environmental responsibility among young students in Israel. The basic question of this case study was whether and to what extent environmental values influence environmental responsibility development? To meet this objective, a case study has been carried out on the relationship between environmental ethics and environmental responsibility among young students in Israel. Specifically, the changes in environmental awareness among the ninth-grade participants (N= 40) in the Hiriya Visitors Center, the landmark of garbage in Israel, taking an excursion to said center, have been examined. The main result was a greater knowledge of students about environmental concepts and awareness of the local environment with significant improvements. It was also found one year after the excursion that the students recalled what they had seen and heard and had developed a perceived pro-environmental attitude towards the environment and became agents of change towards the environment compared to a control group (N = 30 students) who had not disclosed any environmental responsibility in additive environmental activities. A strong correlation has been found between values and environmental responsibility in 9th grade students, and values are directly related to the development of environmental responsibility.

DOI: 10.55040/educa.v4i2.101

Appendix 4 : Publication 2

Hamdan, F. Lara-Sánchez, AJ., Arufe-Giráldez, V. (2023). Critical thinking in environmental education through digital games among students. *Environment and Social Psychology*, Volume 8 Issue 2

Abstract:

In recent years, we have come aware of the importance of digital games-based learning environments among young learners. In order to produce a sustainable environmental education that is interactive, persuasive, and action-oriented, it should be interactive and persuasive. This article explains the insights gathered during the teaching of cognitive knowledge, engaging students emotionally through the demonstration of the consequences of destructive environmental behavior in this article. Many studies show that knowledge acquisition in digital games has a significant impact on collaborative learning compared to individual digital game playing. This method study has been examined among 50 students in a high school in environmental education trend in Jaffa-Tel Aviv, who played a game individually (n = 50), in a collaborative group (n = 40) and in a control group (n = 38). During the designed digital games, the students were asked to complete an open-ended questionnaire to identify their thinking skills. A higher level of attitude learning was observed from games compared to traditional pedagogical methods and pro-environmental behavior was achieved. It is important to continue evaluating the effectiveness of digital games as a learning tool and to identify best practices for their design and implementation in educational settings.

DOI: 10.54517/esp. v 8i2.1725.
