CHAPTER 1

Environment, Environmental Education, Environmental Awareness and Environmentally Friendly Individual

Sinan ERTEN
Hacettepe University

Scenario 1

Mankind could not exist without the earth to which it owes its life and could not have continued to exist to this day. This earth we call our world is an ecosystem. Mankind could not survive alone in this ecosystem. Mankind was able to continue its existence to the present day forming a whole with the other elements of this ecosystem. Aware of this, mankind continued to exist for a long time in keeping with this fact, but in the name of making more and living more prosperously, it could not hold back from destroying nature with the means offered by industrialization and technology rather than protecting nature, to which it owes its life. Although this situation started about 300 years ago, mankind today now has to look for another planet where future generations can live. How and why did mankind come to be in this situation? Before answering this question, let us first dwell a bit on the question "What is the environment we call an ecosystem?"

What is the Environment (Ecosystem)?

The setting in which living and non-living beings interact with each other in balance is called the environment or ecosystem. The living beings here are what we call biotic factors such as producers, consumers, and decomposers. Non-living things are called abiotic factors and consist of soil, water, air, wind, heat, light, and all the physical and chemical conditions that depend on them such as inorganic (elements) and organic (nutrients) matter. All the living and non-living things here form the elements of the ecosystem. For an ecosystem or environment to thrive and be healthy, first and foremost, the balance between living and non-living elements must be maintained. If this environmental balance is disturbed, what are known as environmental problems will emerge (Campbell, 1997; Kiziroğlu, 2004).

It has been recorded by scientists that the most important cause of environmental problems is human activities (Sciama, 2007). Man is only one of the living things in the definition of the environment. There are so many living things apart from humans that neither humans nor other living things can survive without these living and non-living beings. Furthermore, if the non-living parts of the ecosystem such as water, soil, and air, which all living beings including man need to survive, are disrupted, this planet will no longer be able to support human life.

With the opportunities offered by industry and technology, extensive plundering of the ecosystem (nature) has begun, and this required more people. To meet the increasing human population's requirements for food and shelter, etc., the need for even more of the limited resources on the surface and underground was felt. With its requirements met abundantly as a result of this, mankind multiplied uncontrollably, leading to a rapid increase in the world's population. Other important reasons for the increase in the human population are those factors that affected the change in the birth and death rates. The prevention of diseases that cause mass deaths through developments in medicine, the increase in the amount of food as a result of technological developments, good developments in social life, the decrease in wars and changes in their methods, etc. may be counted among these. Thus, the average life expectancy of people has increased and continues to increase. These seemingly positive developments not only put a strain on the carrying capacity of the ecosystem but also caused the ecosystem to be plundered. Technological solutions have been and are being produced to eliminate these negative aspects. For example, the production of pesticides to protect crops from pests, the use of fertilizers to increase yield in crops, the production of GMO (genetically modified organisms) crops, the drying of wetlands, cloning, the production of hormones for early maturation of crops, etc. Good or bad, the purpose of many technological breakthroughs is to protect the world's population from hunger. "Can technological inventions really be a solution to environmental problems?" The answer to this question will be discussed in future topics.

Due to the above reasons, and many other reasons, the human population in our world is doubling at a rate never before seen in history.

Table 1. World Population Growth (Kiziroğlu, 2008)

Year	Billion People	Doubling up	Growth Rate
BC.8000	0.05	1650	0.042
AD. 1650	0.5		
AD.1850	1	200	0.35
AD.1930	2	80	0.875
AD.1975	4	45	1.56
AD.2010	8	35	2

Scientists state that along with the other environmental problems that are going to emerge in quick succession, this will make it impossible to sustain life in our ecosystem. For example, speaking on this subject on the BBC's "Expedition New Earth" program, Stephen Hawking said: "With climate change, people will have to find a new planet in order to survive in the future." According to Hawking's calculations, this period is closer to 100 years. Since the global environmental problems caused by human activities other than the increasing human population problem in the world are discussed in their own chapter in this book, only the topic of zero waste is given as an example here.

An Example Global Environmental Problem: The Garbage Problem and Zero Waste

The waste generated as a result of us being a consumer/throw-away society, extravagance, not utilizing waste enough, lack of education, and other human activities have not only resulted in air, water, and soil pollution, it has also affected the health and living spaces of man and other living creatures and threatens their survival.

Waste is a problem that needs to be addressed urgently due to the consequences of the excessive use of energy and raw materials such as these resources being on the verge of depletion, surface and subterranean water being too polluted to use, soil being contaminated by harmful materials from garbage and no longer fertile, all creatures living in and on the soil being under threat, air pollution, and pandemics.

To find a solution to this problem, we have to look at the causes of the problem. To date, we have not seen any method for solving the waste problem in our society other than support for "recycling." The philosophy of "eat and drink, there is always recycling" was discussed. However, the solution is for individuals to acquire the behavior of reducing garbage/waste production. The zero-waste project that has been put forward in recent years can be a solution to the garbage problem.

The "Zero Waste" project is a project implemented by the Ministry of Environment and Urbanization in 2017 within the framework of sustainable development principles to manage waste and leave a cleaner and more livable world to future generations and is carried out under the auspices of Mrs. Emine Erdoğan. This project has been put into effect in all state institutions and organizations through circulars and further expansion is emphasized. Studies made on its existence in school programs and its implementation in other institutions and organizations to date have shown that it is no different than other zero-waste activities (Erten, 2019). Yet, zero waste means reducing all kinds of waste and garbage production. The first goal of zero waste management is to prevent and reduce waste during production. Zero waste should be included as a subject in the primary and secondary education curriculums, and assistance from subject experts should be sought when adding this subject to the programs. Zero waste does not mean recycling products that can be recycled. Training should be given, particularly to teachers, so this subject can be understood (Erten, 2019).

The path to be followed in the zero-waste process should be like this

1. Reducing the production of garbage/waste across the entire process from manufacturing products to the end-user consumer

2. Repurposing the waste left behind from the products we use

3. Garbage/waste that cannot be reduced after the above reduction work should be sorted into groups, collected, and sent for recycling.

It is always better to reduce the production of garbage/waste as an individual and to seek how and where to utilize any garbage/waste that remains despite this than to recycle garbage or waste. It is better to recycle garbage than to dispose of it using physical or chemical methods or incineration. Zero-waste, on the other hand, means not producing any waste at all, if possible, from the production stage to the final consumption of the product. How is that possible? The examples given below can guide individuals about zero waste (in garbage/waste reduction) (Erten, 2000):

- ✓ If possible, prefer unpackaged products (such as buying unpackaged toothpaste, vegetables and fruits that are not wrapped in plastic, etc.)
- ✓ Leave unnecessary packages at the mall
- ✓ Shop at public markets
- ✓ Buy durable foods in large portions, if possible
- ✓ Prefer refillable products such as Cologne, Milk, Perfume, Detergent, etc. with bottles we can refill when empty.
- ✓ Buy deposit-return products if possible (The country's rulers and the public should insist on the production and use of deposit-return products.)
- ✓ Multi-purpose, environmentally friendly products such as baskets or string or cloth bags should be used for shopping.
- ✓ Products that do not harm human health or the environment, are recyclable, and that can be washed in a natural environment should be purchased.
- ✓ If possible, avoid buying disposable products; products that can be used for a long time should be purchased; for example, the charging devices in such products as cheap, rechargeable hand-held vacuum cleaners break down quickly and cannot be used.
- ✓ We should give the products we do not want to use to other people who will use them, or to charities.
- ✓ We must sort waste: if we throw out waste items together, the products to be recycled cannot be recycled.
- ✓ We should prefer recycled products.
- ✓ If possible, we should compost household and garden waste.
- ✓ We should use environmentally friendly products. We should not buy products such as plastics, short-lived products, or plastic school bags.
- ✓ We should use rechargeable batteries and not buy disposable batteries and we must not throw them away under any circumstances.
- ✓ Our children soon get bored with the toys we buy for them and stop playing with them. They want new toys instead. We can reduce their toy waste by creating

exchange markets instead of buying new toys.

- ✓ Packing individual cubes of sugar to have the company's name written on each one or packaging food like this not only consumes energy resources but also increases environmental problems. We should consider it our duty to renounce such behavior and adopt environmentally friendly behavior when we buy these kinds of products.
- ✓ We need to stop buying all kinds of food sold in mini portions and make our young people realize that this is wrong. For example, tiny cheeses, jellies, honey, oil, and similar products cannot be the behavior of environmentally conscious people.
- ✓ The Zero Waste project should be approached with an Ecocentric perspective, not an Anthropocentric philosophy.
- ✓ Nowhere in the world can environmental problems be solved without the money coming out of our own pocket and without compromising our own comfort.
- ✓ To achieve this, people need to be informed about this issue starting in pre-school education all the way through to university graduation. The zero-waste subject should be included in preschool, primary, secondary, and high school education programs.

The pictures below will be enough to see what waste is doing to our world.

Picture 1.

The Garbage Crisis That Threatened War: After the accumulation of garbage containers over the years, Philippine President Rodrigo Duterte announced that he would declare war on Canada.


The Seventh Continent is the name given to the huge pile of waste in the middle of the Pacific Ocean, one of the most visible consequences of the Anthropocene era and global warming. The "Seventh Continent," as it is called in popular science, consists of a pile of plastic 3.4 million square kilometers wide and weighing 7 million tonnes. It shows how human waste has given the world a new continent in the middle of the ocean (Web).

What must we do?

"Humanity is at an historical turning point. We face continuing disparity between nations and each other, increasing poverty, hunger, disease, and illiteracy, and the growing collapse of the ecosystems on which we depend for our survival. However, by integrating environmental and development considerations and paying more attention to them, it will be possible to achieve a safer, more prosperous future by meeting basic needs, improving living standards for all, and protecting and managing ecosystems better. No nation can do this alone; only together through a global partnership for sustainable development can it be achieved" (Ministry of Environment). The above statements, which hit the world's agenda exactly 30 years ago, revealed that the agenda of the 21st century is environmental issues, as can be understood from the name of the conference, also referred to as Agenda 21.

The owners of giant international shopping mall chains throughout the world have turned us into a "consumer society" with their consumption habits to earn more. With our consumer society habits, the more we shop outside of our basic needs, the happier we become. Consumption society means the consumption of the world's surface and subterranean resources and those human communities that do not know there are global environmental problems.

If we do want to get rid of environmental problems, we must abandon our Consumer Society habits. As individuals, we should only shop for our basic needs because energy is used to produce every product we buy. In secondary school, we learn that energy is the power to do work. Whatever is produced, energy must be used. If energy is used, there are bound to be waste gas emissions. Of these gas emissions, methane gas plays the lead

role in global warming. As these emissions increase, it becomes less and less possible to reduce environmental problems. Every shoe purchased, every phone, every computer, every extra meal eaten, every wasted light bulb in public or private buildings, radiators on for no reason, radiators hidden among furniture, every torn notebook, starting electric and motor vehicles, using cars to travel walking distances, using an electrical device such as a hairdryer when a towel will suffice, using dryers to dry clothes that could be dried in the open air; these and similar activities done by us mean air pollution, damage to the ozone layer, global warming; it means the rain that is called a blessing becoming a disaster; it means floods, typhoons, climate change; it means 1 billion people going without food, 1 billion people going without water; it means various diseases caused by pesticides and fertilizers. It means children born into the world disabled (See. 17.8). Ultimately, it means our world returning to the Ice Age.

Humans cause 49% of global warming with energy use, 24% with industrialization, 14% with deforestation, and 13% with agriculture (Ministry of Environment and Forestry, 2008). If we were to plant only trees, global warming would fall by 14% as a result. In this way, not only will absorption be reduced but also production will increase. If we use energy sparingly, we may be able to prevent global warming.

Characteristics of Environmental Problems and Environmental Education

The biggest characteristic of environmental problems is that they are not local but global. These environmental problems affect everyone, regardless of religion, language, race, old or young, male or female, rich or poor, academic or farmer, villager or city dweller, science or music teacher, mathematics, chemistry, or physics teacher. Therefore, protecting the environment is not only the duty of environmentalists, and giving environmental education is not only the duty of environmental educators. Protecting the environment is everyone's duty. In all lessons, a connection should be made between the courses in question and the protection of the environment.

What Is Environmental Education?

Making changes in people's behavior is one of the main aims of education and is also included in the definition of education. To overcome environmental problems. we first need a tool. That tool is environmental education. The goal here is to raise individuals who can exhibit environmentally friendly behavior, and we say that individuals who behave in this way are "environmentally-conscious" individuals. In terms of its features, environmental education differs from environmental science or other ecological education.

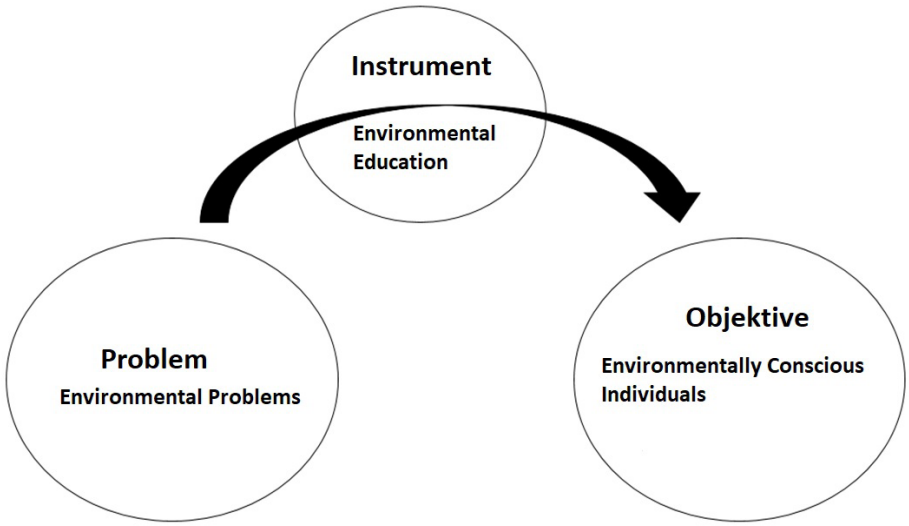

Figure 1. The Relationship between Environmental Problems, Environmental Education, and Environmental Consciousness

Environmental education imparts ecological information while at the same time promoting the development of attitudes toward the environment in individuals and converting these attitudes into behavior. Environmental education appeals to students' cognitive, affective, and psycho-motor learning areas. Environmental education is the process of developing attitudes, value judgments, knowledge, and skills for the protection of the environment, exhibiting environmentally friendly behaviors, and seeing the outcome of all this.

The earlier environmental education starts, the better. This is because the interests and attitudes formed at pre-school and school age form the basis of desired behaviors in the future. Value judgments and attitudes, particularly those formed in childhood and young ages, are very important for the development of empathy and affection for nature in relationships with nature at an early age. Their formation means protecting the environment and exhibiting environmentally friendly behaviors. These developmental stages will be the learning in the affective field that should be taken into account and that will later help the development of environmentally beneficial behaviors and consciousness in individuals. At these ages, children are made to play games that endear nature and they get to experience nature. Through these games and experiences, children acquire positive emotions and learn to behave in an environmentally friendly manner. The individual who learns that nature is a value becomes aware of its beauties with all his senses and makes an effort to protect it. People protect their loved ones, so making children love animals and plants should be one of the most basic aims of environmental education. Environmental education at all levels of education should not be limited to a certain lesson period but should be given in every lesson, if possible, by associating it with each subject. For this, every teacher has to be mindful of environmental problems, that is, be an environmentally conscious individual.

What Does Environmental Consciousness Mean?

Although the concept of environmental consciousness has a wide range of uses, the area where it manifests itself most intensely today is politics. Aimed at environmental consciousness, as many scientists have emphasized, environmental knowledge is an attitude towards the environment and behavior that is beneficial for the environment. We can briefly explain them like this:

Environmental Knowledge: All information about environmental problems, solutions sought to these problems, developments in the ecological field, and nature.

Attitudes Toward the Environment: All the attitudes and ideas, beautiful or ugly, beneficial or harmful, agree or disagree, positive or negative, etc. that people have about the environment such as fears stemming from environmental problems, anger, disgruntlement, value judgments, and readiness to solve environmental problems.

Environmentally Beneficial Behaviors: They are genuine behaviors shown for the protection of the environment. Such behaviors are regarded in the literature as environmentally friendly or environmentally beneficial behaviors.

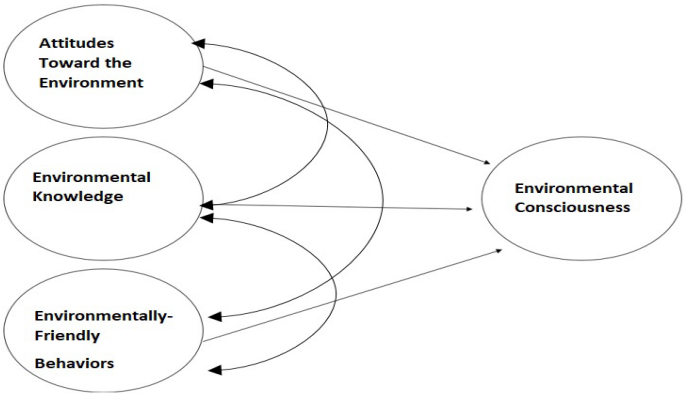

Figure 2: Environmental consciousness and aspects of environmental consciousness

However, studies carried out in the field of environmental consciousness so far have shown that *environmental knowledge* has little effect on *environmentally beneficial behaviors* and *attitudes toward the environment* do not have much meaning in *environmentally beneficial behaviors*. An environmentally conscious person is someone who, in addition to having environmentally friendly behaviors, does not remain impartial or insensitive to environmental degradation, does not act selfishly, and does not turn his personal gains into ambition (Haan et al., 1997; De Haan & Kuckartz, 1998; Erten, 2004; 2012).

Who is an environmentally conscious individual? If a person with a lot of knowledge about the environment does not make any effort to reduce waste, does not act frugally or economically in energy use, for example, if he uses his private car by himself, even to places where he can go on foot or by public transport, if he speeds over 100 km

while driving although it is not necessary, if he does not look at the energy labels when buying a car and white goods and does not buy a car or furniture that consumes the least energy, if he keeps the room temperature at work above 20 degrees C., if he has door and windows open when the radiator is on and this does not bothers him, if he is not bothered by his computer staying on for hours even though it is not working, if he does not turn off the light bulbs even when it they are not needed at all, does not use water sparingly, for example, if water running for hours or days from broken faucets at work or anywhere does not bother him or push him to do anything about it, etc., if he does not have the behavior of preferring deposit-return products in his shopping as much as possible, if he does not have a habit of looking at how harmful the product he will buy is to the environment; if he shops with a consumer society mentality, if he stays silent when he sees people harming the environment and does not inform the authorities or exhibit similar environmentally protective behavior, we cannot say this person is environmentally conscious. This knowledge that this person has about the environment has no meaning either. Even if the person who does not demonstrate environmentally friendly behaviors knows all about the environment, this does not mean a thing.

Points to Consider in Environmental Consciousness Research

The study of behavior for environmental protection is difficult, just as it is with almost all empirical studies on environmental consciousness. This difficulty stems from the methods used in the research as well as the fact that the individual behaviors of the individuals participating in the research cannot be observed and are limited only to verbally expressed behaviors. These can be briefly explained as follows: In empirical studies conducted to date on environmentally beneficial behaviors, behavioral questions have been asked only in one area (for example, only sorting garbage, using public transportation, determining attitudes towards the environment, and the extent of environmental knowledge). In a study conducted in this way, the fact that individuals do the behavior in the area in question does not indicate that they also engage in other behaviors that are beneficial to the environment. This means that a study cannot obtain sufficient general information about individuals' environmentally beneficial behaviors or environmental awareness. Therefore, studies should include questions from many areas of behavior beneficial to the environment and not be limited to specific areas. In addition, the fact that a group's attitudes or knowledge about environmental protection are high does not mean that this group or these individuals display or will display environmentally friendly behaviors. Studies also need to include environmentally friendly behaviors in addition to these. Only with the information obtained this way can we talk about individuals' environmental awareness (Erten, 2004).

Another problem in studies is that questions that provide information about how much individuals can sacrifice their comfortable lives for the protection of the environment are

almost never included in the questionnaire. For example, it is not a very taxing behavior for a person to take bottles to the bottle bank near his house. On the other hand, if the bottle bank is a few kilometers from the person's home, will he still be able to display this behavior? If the residents of a house or building that is not insulated refrain from spending money on making it insulated, even if they do engage in other environmentally friendly behaviors, it will not be easy to say that these people are environmentally conscious. Therefore, future studies should consider how much the person or people are willing to sacrifice materially or morally for an environmentally beneficial behavior.

Apart from this, it should also be taken into account whether the behaviors for the protection of the environment to be investigated are really for the protection of the environment. For example, in our country and in many developing countries, especially in big cities, some people collect garbage and make a living from it. We cannot talk about the people being environmentally conscious by looking at them or doing research with them because they do this for their livelihood, not for the protection of the environment. In Ankara, 67.6% of families reported being "often and very often" angry that their children leave their doors and windows open while the heating is on. Is this behavior due to the families having a high degree of environmental consciousness, or is it due to them having trouble getting by due to the recent economic crisis (Erten, 2003)? Considering these and similar factors in studies will provide us with sounder and more reliable information about individuals' environmental consciousness.

Environmental Consciousness in Turkey

Studies conducted so far have revealed that students' knowledge of the environment is incomplete and that their attitudes are insufficient and have an insignificant effect on their behavior. If the following research examples are examined carefully, the contrasts between knowledge, attitudes, and behaviors can easily be seen. In addition, these studies can give us a general idea about what students know from the 5th Grade of primary school to university, what their attitudes are, and how environmentally friendly they behave (Erten, 2003). The study results below are not given in detail due to space constraints, but only as a summary to provide a general point of view.

Anthropocentric, Ecocentric, and Antipathic Attitudes

Before exhibiting any behavior, a person considers what they stand to gain or lose if this behavior occurs in their mental world. He calculates profit and loss (Diekmann & Preisendörfer 1992). We can think of it as utilitarian philosophy. Scientists have conducted a lot of research to reveal ecocentric, anthropocentric, and antipathic attitudes and value judgments about the environment and the differences between them. What is meant by an ecocentric, anthropocentric, or antipathic person? If a person sees the world as a value in its own right, believes that nature should be protected without prioritizing

his own interests, and acts accordingly, such a person has ecocentric thought. Such persons may regard plants, animals, and people as having equal worth. An ecocentric-thought-centered individual prioritizes the protection of the environment in the recovery or recycling of wastes and the efficient use of water and energy and avoids any behavior that may cause environmental problems. Considering the protection of the environment, except in cases of necessity, he prefers public transportation over his private vehicle.

Anthropocentric people want to protect the environment because it is indispensable for improving people's quality of life and maintaining people's lives. According to them, the environment should be protected because it is for the benefit of humanity, and protecting the environment means protecting people. They aim to do whatever is in man's best interest, so it does not matter whether the environment is damaged or not.

Environmental pollution (air, soil, and water pollution, etc.) should be prevented as it threatens human health. Natural resources should be used sparingly so that we do not lose energy in the future or see our quality of life decrease. Anthropocentric attitudes are based on utilitarian philosophy (Erten, 2007; 2008). The person who has a dislike for the environment believes that environmental problems are exaggerated, does not enjoy talking about environmental protection, says that he is tired of environmental issues, and believes that environmental problems are artificial agendas.

Fossil-Based Energy and its Importance in Terms of Environmental Problems

It is a well-known fact that coal, natural gas, oil, and derivatives, which are currently used as energy sources in our world, are exhaustible or non-renewable energy sources. However, instead of engaging in more frugal behaviors in the use of energy resources, the use of energy has increased and is increasing day by day. As a result, the harmful effects of gases, which are the waste of fossil energy sources, on the environment we live in are constantly increasing and threaten the existence of people and other creatures on earth. First of all, in response to the energy crisis that started in the world in 1973/74, many developed countries and scientists started work on finding a solution to this problem. Among the solutions they considered, they saw finding new energy sources (renewable energy sources) and adopting many measures such as reducing the use of vehicles as energy-saving solutions. They reached the consensus that this would be possible, in part, with the measures to be taken in the production of energy-efficient technologies, and also through education to reduce the energy consumption of social institutions and individuals (Erten, 2000; Wortmann, et al., 1988; Wortmann, 1994).

Just as in other fields, teaching theoretical information in the field of energy-saving is not enough; the most important thing is the emergence of energy-saving behavior. Many people in society know why they need to save energy but cannot turn this knowledge into behavior. And herein lies the problem. To be successful in energy saving, work is needed on improving behavior.

It is possible to list a few examples of creative projects that improve students' energy-saving behavior and that I have done in class without going into details due to space constraints (only the last project is explained as an example), as follows:

1. Investigating the amount of garbage (plastic cups and bottles) produced by bus companies while offering refreshments to passengers and the energy spent on them.
2. Investigating the relationship between gases that cause global warming and energy extravagance.
3. Identifying deposit-return products and investigating the relationship between these products and energy saving.
4. Investigating why some products need to be recycled in terms of energy saving.
5. Using wastepaper to make paper that can be used by students in various fields and investigating its connection with energy-saving.
6. Having students follow up energy-saving work at home or school and investigating the efficiency of their work.
7. Enabling students to acquire environmentally friendly behaviors toward more efficient use of energy, by having 50%-50% projects done in schools and similar projects.
8. Cars, which almost everyone wants to have today, play a leading role in the formation of environmental problems, especially in air pollution and global warming. Of course, air, land, and sea transportation vehicles have made distances smaller and effectively stopped time and have become indispensable today. However, they also play an important role in the creation of environmental problems. For this, it will be enough to look at the energy label of an ordinary car, below. The car that has been given the energy label in question puts 130 grams of carbon dioxide (carbon dioxide emissions) into the atmosphere per kilometer (km). This makes 1 kilogram of carbon dioxide per 7 km. Emissions other than carbon dioxide are not yet counted.

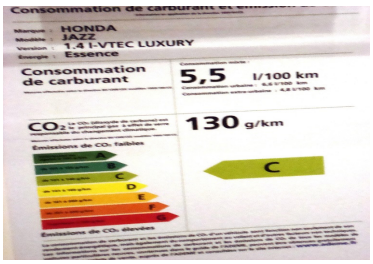

Figure 2.

Case Study: The distance between Hacettepe University Beytepe Campus and Eskişehir road, which is the main road, is 5 km, becoming approximately 7 km to reach the various departments. A person who travels to Beytepe campus from the Eskişehir road and back covers 14 km. This means 2 kg of carbon dioxide emissions for just one car. By having

the students count these cars at noon one or two days each semester, we determine the approximate number of cars per day and calculate the daily emission amount. Getting this confirmed by officials, we learn that this number is over 15,000 cars. This means 15,000x2=30,000 kg of carbon dioxide emission. The carbon dioxide emission of the cars entering and leaving the Beytepe campus from the Eskişehir road alone in one day is 30 tonnes. We would have done less harm to ourselves, our world, and future generations if public transportation had been used instead, or if there had been 5 people coming to campus in a car. When it comes to complaining about environmental problems, we all refrain from complaining.

9. What does it mean to identify electrical devices and equipment that are left on unnecessarily and calculate their monthly electricity consumption?
10. What does it mean to compare a domestic product with an imported product in terms of energy consumption, and how should an environmentally conscious person act?

For example, we import citrus fruits from Israel, onions from Romania, and peaches, tea, barley, wheat, rice, apples, etc. from European Union countries, and when we join the European Union many more such products will come to our country. Environmentally conscious people will prefer to buy whichever product causes the least harm to the environment by the time it reaches the consumer to prevent more damage to the environment by considering the table below. In short, an environmentally conscious individual protects the environment and his country by purchasing the products closest to where he lives. It is necessary to carry out these studies to instill this consciousness. At the same time, this will ensure that energy-saving behavior is realized in the long term and on a global scale. The energy used in the construction of transport vehicles and the replacement or repair of their parts should not be forgotten.

Table 3. The Amount of Energy to Produce Imported Products

Country	Agricultural Product	Distance to Ankara (km)	Energy Spent (Diesel/lt)	Emission Amount (kg)
European Union countries	Tea, peach, apple, rice, barley, crude oils	2200	440	314,3
Romania	Onion	800	160	114,3
Israel	Citrus	1040	208	148,6

Table 4. Domestic Products and the Amount of Energy Consumed According to their Distance

Country	Agricultural Product	Distance to Ankara (km)	Energy Spent (Diesel/lt)	Emission Amount (kg)
Rize	Tea	675	135	96,4
Ankara	Onion	0	0	0,0
Antalya	Citrus	450	80	64,3

**NOTE: The distances of the countries from Ankara are calculated approximately

Interpretation of the Results of the Studies Conducted to Date and Recommendations

Caring for plants and animals and getting to know them instills affection for them and the need to protect them. People protect what they love and are familiar with. In the development of environmental consciousness, the main starting point is to get to know plants and animals, to increase interest in them, and to destroy fear and phobias regarding animals. Studies have revealed that people who care for plants and animals in their childhood and have childhood experiences in nature are more mindful of environmental problems or take on more voluntary roles in non-governmental organizations than people who do not exhibit these behaviors in their childhood.

It is understood that teachers and students cannot grasp the relationship between fossil fuels or natural resources and the products used and cannot transform the knowledge they have learned into behavior in their daily lives. On the other hand, the results can be explained with the Low-cost/High-cost (easy/difficult behavior) theory. According to this theory, individuals consider the "cost-benefit" aspect from their own perspective when engaging in environmentally beneficial behaviors. **I**f a behavior does not require sacrificing the comfort of the individual, spending money out of their own pocket, and is easy to do, such behavior is "Low-cost" while behaviors that are the opposite of this are considered to be "High-cost" behaviors. For example, behaviors such as sorting garbage, switching off electrical appliances, and turning off faucets are "Low-cost" while behaviors such as choosing public transportation by reducing the use of private cars, insulating uninsulated houses, not speeding the car over 100 kph when there is no emergency, providing financial assistance for the protection of the environment, collecting used bottles and taking them to bottle banks located far away are considered to be "High- cost" behaviors. It will be possible to explain many results in studies with this theory (Diekmann & Preisendörfer, 1992).

Perceiving environmental problems as a risk and seeing them as a threat is also very important in terms of motivating environmentally beneficial behaviors, but it cannot be a correct and desirable education method to talk to children about negativities all the time, because children should not lose hope for the future. If an individual cannot look to his future with confidence, his joy of life is lost (Erten, 2002).

As can be seen from the results, possessing high environmental knowledge and environmentally conscious attitudes in environmental consciousness studies is not enough for people to engage in environmentally beneficial behavior. In environmental consciousness research, it is not a correct approach to say that environmental consciousness is high by looking only at positive attitudes toward the environment or a person having sufficient environmental knowledge. Studies show that it will take time for positive attitudes to turn into behavior (Erten, 2012).

What can be done?

Rather than teaching this knowledge in artificial environments, it should be transformed into a practical form that can be used in everyday life.

For the desired environmental education to be delivered effectively in schools, first of all, the teachers working in these schools must be environmentally conscious. Furthermore, the environmental consciousness of other personnel working in these schools needs to be improved through in-service training or seminars. This is because a person who does not learn cannot teach another person; to put it another way, a farmer will not plant a product that he is not familiar with in his field or garden.

The environmental work carried out in the schools where the study was conducted is not sufficient. Environmental education is not among the priorities in schools' education programs, at least not in practice. Few schools have plant cultivation and animal husbandry studies. Apart from these, some schools organize day trips. However, the primary purpose of these trips is to have a picnic instead of getting to know nature or gaining experiences in nature.

Environmental issues on the agenda of Turkish and Azeri students rank 4th place among Azerbaijani students and 5th place among Turkish students. Even though global warming, which is one of the environmental problems, has been on the agenda of the world recently, the fact that it is not at the top of the agenda of Turkish and Azerbaijani students reveals the need to improve these students' environmental consciousness. There is a need to increase the interest of Turkish and Azerbaijani students in plants and animals. The fact that the variables of caring for plants and animals appeared as predictors of general environmental consciousness scores in the findings reveals how necessary this is. Protecting the environment is the same as protecting all living things in the environment. In their lessons, teachers should strive to increase students' interest in living things, develop empathy towards living things, and develop a love for living things instead of the hatred and disgust for them formed in children (Eschenhagen et al., 1998). Tales, stories, poems, and songs that denigrate animals, portray them as monsters, make them hate and disgust them (e.g., Little Red Riding Hood, the We Go Chopping Trees song, etc.) should be avoided by teachers in kindergartens, primary, and secondary education, and even undergraduate education. Teachers should instill interest and love toward living things in their lessons. This is because interest teaches love and love teaches protection, and people only protect what they love.

Turkish students' total scores in knowledge, attitudes and behaviors toward the environment are higher than the total scores of Azeri students in these areas. In light of this outcome, it can be said that Turkish students are more environmentally conscious than Azeri students. The lowest scores among the dimension are the behavioral scores.

This finding also emerged in the effects of attitudes and knowledge on behavior. This is particularly evident among Azerbaijani students. There is a need for environmental education starting with kindergartens to increase students' environmental consciousness in both countries. It might be possible to develop environmentally-friendly behavior by teaching the knowledge to be taught in the settings in which it will be used later. It is not possible to use the knowledge learned in artificial settings in real and complex life settings (Gräsel, 1997). For this reason, in environmental education, students need to be taught in the affective, cognitive, and psychomotor areas, lessons should be taught through activities to be carried out outside the school and in natural settings, and environmental problems should be discussed.

Easy behaviors explain 21% of the environmentally friendly behaviors in Turkish students. An individual considers the "cost-benefit" aspect from his own perspective when engaging in environmentally beneficial behaviors. If a behavior does not require sacrificing the comfort of the individual, spending money out of their own pocket, and is easy to do, such behavior is "Low-cost" while behaviors that are the opposite of this are considered to be "High-cost" behaviors (Martens & Rost, 1998; Erten, 2005).

To create environmentally conscious individuals, first of all, education should be given to reinforce the environmentally centered (ecocentric) attitudes of the students so that they can move away from the "cost-benefit" approach in protecting the environment. Today, the biggest handicap to environmentally friendly behaviors is the "utilitarian" philosophy.

The fact that attitudes and knowledge cannot explain behaviors, especially in Azeri students, and that it has an effect of only 21% on Turkish students is an interesting but no less expected result. To solve this problem, it is necessary to change the social makeup. Attitudes do not turn into behavior in societies that are not democratic or where democracy has not fully taken root (Frey et al., 1993). This issue should be addressed in lessons by all teachers and all students should be supported to become individuals who can make their own decisions from an early age, have self-confidence, and do what they think is right.

To create an environmentally conscious society in general, supradisciplinary environmental education should be given to all teachers in a way that will develop environmentally friendly behaviors, starting with kindergartens, primary and secondary education institutions, and undergraduate education (De Haan, 1989). In primary and secondary education, in particular, environmental education lessons that evaluate students' environmental consciousness with points should not be included as lessons. Every teacher has to do something to protect the environment in their lessons and every individual has to be an environmentalist.

Statistically significant differences were found between boys and girls in aiming to save energy. These are as follows:

1. Girls and boys know about energy conservation from their schools; however, this knowledge does not have a significant impact on the behavioral objectives of conserving energy at home.
    - The study shows that student's knowledge about energy conservation comes from school. In other words, although the students have acquired the knowledge that they should use energy sparingly, the probability of this knowledge turning into behavior is low. This shows us that the information given in schools cannot be used to solve problems in daily life. Education and training on this subject should not be theoretical and based on memorization; rather, it needs to be aimed at developing behaviors in practice.

    - Behaviors that are beneficial to the environment are acquired through family and friends, through the experiences gained from the beauties of nature, through learning experiences in nature, through behavior-instilling environmental knowledge, and through being informed by media institutions.

2. Although female students have the opportunity to save more energy at home, male students believe that they will do far more energy conservation activities at home than the girls (recommendation for this is in Item 4).
3. I have "so many.... too few" opportunities at home to save energy or

it is "so easy.....too hard" for me to do. The answers given by female students to these question propositions are more negative than those given by male students. However, in a country like Turkey, aiming to save energy at home is expected from female students rather than male students. This indicates that female students are less confident than male students in their own efficacy and influence on saving energy at home.

4. Girls should be reassured to recognize the impact of their own behavior; they should be supported in realizing that their own ideas are just as important and worthy of respect as the male student's ideas. Considering that most of the housework is carried out by women and girls in our country, it is quite clear how effective women and girls can be in using the energy in the house sparingly. More efficient outcomes would be obtained if female students had confidence in their activities to save energy at home.

When the behavioral objective of *"using energy sparingly"* is compared with the behavioral objectives of "*using water sparingly"* and "*reducing garbage,"* there are fewer explanations for this behavioral objective.

The fact that Turkish teachers' anthropocentric centered attitudes average higher than German teachers' attitudes on the same subject may be because the cultural structure of Turkish society on this subject is based on the idea that humans are created superior to other living things. It should be investigated whether this notion leads our people to the wrong idea of using nature without limits and the results used in re-educating our people on this topic.

While the German teachers agreed with the ecocentric attitude recommendations, they were undecided on the anthropocentric attitude recommendations. This outcome can be explained as follows: One of the most important differences between Turkish society and German society is the difference in the education system. In the past 40-50 years, Germany has made great progress, particularly in the field of environmental education, and they have made great efforts in the family and education system to protect the environment. In addition, as Germany is an industrial country, the people living there have been bothered for a long time by many environmental problems such as environmental pollution, acid rain, noise pollution, and nuclear waste problems. This negative situation has led to the rapid development of environmental consciousness studies. This is because research shows that "when environmental problems are perceived as a risk and seen as a threat, this motivates the individual to adopt environmentally beneficial behaviors." In addition to all this, the effect of penal sanctions to protect the environment should not be forgotten.

Among German teachers, just as with Turkish teachers, there was an inverse correlation between ecocentric attitudes and dismissive attitudes toward environmental protection. This shows that the more ecocentric a person is, the less dismissive they are toward solving environmental problems. The fact that German teachers and Turkish teachers have similar dismissive attitudes toward environmental issues may be because in Germany, environmental issues have been occupying the agenda constantly for the past 50 years, many laws on this have been enacted, and there are frequent demonstrations. In addition, some of the regulations made must have disrupted their interests. In light of the information obtained from short interviews with Turkish teachers, the dismissiveness seen in Turkish teachers can be explained as follows: It may be because economic and terrorism problems, not environmental problems, are first among the problems of people living in Turkey. When the ecocentric, anthropocentric, and dismissive attitudes of the Turkish and Azerbaijani preservice teachers are examined, the difference between the overall scores shows that the Turkish teacher candidates have more ecocentric attitudes than their Azerbaijani counterparts. When the overall scores of anthropocentric attitudes were examined, no significant difference was observed between Turkish and Azerbaijani preservice teachers. The scores of both Azerbaijani and Turkish preservice teachers toward the environment are quite low. This shows that the pre-service teachers participating in the study do not have concerns about environmental problems and do not intend to do

anything toward solving environmental problems. The reason for these results can be explained by the fact that some of the people in both countries have different problems to think about before environmental problems, in addition to having low environmental consciousness (Erten, 2007; 2008; 2011).

Can Technology Be the Solution to Environmental Problems?

Some people claim that developments in technology will be enough to solve environmental problems. Yet, it is technology that causes environmental problems to emerge. What kind of solution can be expected from technology when it is primarily responsible for the creation of environmental problems?

The discovery of radioactive material in the 20th century delighted people at that time. This joy turned to ashes when it was later discovered that it was a major cause of cancer. The same joy was experienced in the discovery of chlorofluorocarbon (CFC) gases, and humanity was shocked to learn that they also play a leading role in the destruction of the ozone layer today. The discovery of DDT and pesticides also took its place in human history as a miracle. DDT is a pesticide that was used for many years before its use was banned by the United Nations in the 1970s. Interestingly, DDT is still used in our country.

What are pesticides? Pesticides are all the chemicals that scientists have discovered to destroy the creatures that damage agricultural produce. There are thousands of these types of chemicals in use today. The production and use of pesticides have become widespread, as if scientists, whose research discovered that one-third of crops planted were eaten by other living things, said: “Why are we going to share our crops with other living things, we shall destroy them with science and technology,” as it were.

Why did the northern bald ibis species go extinct? Some of us may not agree with the statement that the northern bald ibis species is extinct, because these birds can be produced on production farms under human control. Migratory birds that leave our country in the fall and come back in the spring on their own in nature can no longer carry out this cycle. So, what is the reason for the disappearance of these birds? The northern bald ibis birds have disappeared due to the use of pesticides in agriculture. How did this happen? Since these birds are insectivores, they had to feed on insects that were poisoned by insecticides. The insecticides accumulated in dead insects harmed the birds, affected their reproductive function, reduced their egg numbers, crippled the hatched chicks, stunted the growth of new offspring, and caused the bald ibis to come to the point of extinction by stopping the reproductive function. To feed the increasing world population and earn more, scientists discovered fertilizer. It was produced with technology and used in agriculture for years and is still being used. Naturally, through precipitation, these fertilizers, which were dumped onto agricultural areas, mixed with

the sources of drinking water under the ground and polluted it. Not only that, but they also get into lakes and seas through streams, disrupting aquatic ecosystems and negatively affecting the living population.

Biology, which is the science of living things, is a branch of science that developed as a result of people's curiosity from ancient times to the present day, the results of which people benefit from the most. The developments in biology in the last 200 years have reached a point that no one could ever have imagined. The world's population has increased rapidly as a result of the end of large-scale wars in the world, the discovery of the causes of epidemics by biologists, and positive developments. In the early years of the Gregorian calendar, it would take more than 1,000 years for the world's population to double but in the last century, it took just 50 years for the world's population to double (Kiziroğlu, 2004).

The rapid increase in the world population has brought with it many global problems, and if it continues like this, the problems will increase. The first of these problems is that of "feeding." To solve this problem, scientists have used and will continue to use findings from biology. Knowledge in the field of genetics, in particular, has initiated plant and animal breeding studies.

Plant and animal breeding has resulted in a great increase in plant and animal products. For example, cows once yielded 5 kg of milk but now yield 40 kg. Vegetables and fruits that quickly decay or rot are being produced that can last for a very long time. With the developments in biology and technology, fields now yield 5-10 times what they used to in crops. Great success has been made and will continue to be made in four-season produce, better fruits, more milk, milk that does not go off for months, meat the can be consumed after being kept waiting for months or even years, and other produce.

Thanks to the developments in biotechnology and genetics, many diseases have become curable, artificial hormones and interferon have been produced, and it is now possible to deal with unwanted genes. In the future, it will be possible to remove diseased genes from DNA and create healthier new generations. Genes that can cause other diseases that may occur before or after birth will be rendered harmless.

The mapping of the human genome as we entered the 21st century will reveal what secrets these genes have. This is one of the greatest achievements of biology ever made concerning man.

The acceleration of space studies in the 1950s and later imposes on biology the task of researching life forms that are likely to be found in space. Stem-cell research at the beginning of this century has delivered concrete results. It is expected that diseased genes and organs can be regenerated with stem cells.

In addition, “live copies (cloning),” which was first performed in salamanders and frogs in 1950, took place with “Dolly” the sheep through work on mammals in 1996. Scientists are trying out cloning on many creatures and there may even be some who want to clone human beings.

The main reason for the emergence of studies to clone living things is to prevent endangered species from becoming extinct. This may prevent some living species from disappearing in the future.

The joint work of biology and other sciences and technology has, of course, extended the average life expectancy of human beings. In addition, people will be able to lead a more comfortable life than in previous years.

Many of the above-mentioned biological and technological developments have resulted in a wide variety of diseases and environmental problems, polluted water, soil, and air, flavorless foods that have deviated far from their primary ancestor, and scientifically unethical research (such as human cloning, etc.).

Technological inventions have provided people with comfort and convenience, but they have also brought many problems. For example, environmental pollution, especially air pollution, harms human health. The most harmful gases that are seen in air pollution come from the exhausts of cars and the chimneys of factories and houses. It is known that these toxic gases affect the respiratory tract, destroy lung tissue, adversely affect the functioning of the nervous system, and cause breathing difficulties and asthma.

Another toxic waste from fuels causes damage to children’s brains. The chemical substances that get into the water through various paths such as industrial complexes and the detergents we use at home are extremely harmful to human health. Bacteria and viruses in drinking water can cause diseases such as typhoid and cholera. Therefore, water must be cleaned. However, excessive chlorination to clean drinking water and swimming pools can also harm human health. It is a fact that the chemicals used in the cultivation of foods also cause many diseases.

In the past century, humanity has witnessed the dark and frightening uses of many scientific developments. The positive image of science has been eroded by the unpredictable environmental and social impacts of various scientific and technological developments. We have learned that with developing technology, the habitats of living things are endangered, resources are decreasing, and our environment is becoming increasingly polluted due to the increase in the human population and developing industry.

As the human population increases, so do the needs of the people. Their needs increasing, people consume more materials and create more waste. As the number of cars on the

roads increases day by day, the environment in which people live is shrinking. The air is polluted and our energy resources are also running out. People have made inventions that not only feed the increasing population but also make their own lives more convenient. We can easily go anywhere we want with our cars, and we can easily access all kinds of information thanks to our computers and the Internet. We can buy the fruits and vegetables we want in every season. Unfortunately, this convenient life and these technological discoveries have upset the relationship between man and the environment.

For example, the garbage accumulated in the coastal part of Northern Honduras, especially in the past three years, started to turn into huge trash islands in November. These "trash islands" have become a major ecological problem not only in the Caribbean but also in all of Central America, and they threaten the ecosystem in the region.

It is claimed that the garbage, which is mostly hospital waste and plastic, is dumped by communities in Guatemala. The plastics that make up these garbage islands have been floating in rivers and streams for years. While the garbage islands cause fatal damage to the underwater fauna, tests carried out in November found that these trash islands had caused the death of many fish and turtles that had been found dead. According to the data of the UN Environment Institute for 2017, 70 percent of the 6.4 million tonnes of garbage in all seas goes to the depths of the ocean every year, while a significant part of the remaining amount turns into garbage islands, as in the Caribbean.

The examples mentioned above are enough to explain the effects of practices in science and technology on the environment. All these environmental problems threaten human existence and make our world uninhabitable. One way to put a stop to this great disaster is for scientists, technology producers, decision-making rulers, in short, for all people to give up their traditional fossil fuel-based development and developmental habits now and in the future.

Some environmentally friendly inventions in recent years concerning the future of the world and reducing environmental problems, environmentally friendly technologies, development efforts based on renewable energy, the gradual emergence of minimalist and zero-waste lifestyles, the obligation to use recyclable products when making new products, the fact that cleaning products to be made in the future are environmentally friendly, the increase in organic farming activities, and similar developments, while not enough, do give people hope for the future.

Another issue that is at least as important as all those is the need to raise environmentally conscious individuals. An environmentally conscious individual is an environmentally friendly individual. It is a person who avoids all kinds of waste with their behavior, who uses underground and surface resources sparingly, who avoids extravagance, realizing that energy is spent even in manufacturing a needle (not forgetting that this energy is also

there in the creation of environmental problems), and who knows that a lot of effort and sweat and tears goes into all kinds of manufactured products when using them. When societies are made up of people with these characteristics, it means this beautiful world of ours will become a habitable planet again.

Final Word: It should not be forgotten that "We did not inherit the underground and surface natural resources we have now from our grandfathers, we borrowed them from our grandchildren." Let us be environmentally friendly so we can deliver what has been entrusted to our care without betraying it.

Scenario 1

Başak, Esra, and their father got off the bus this evening, as they do almost every day. Başak told her father that they needed to go to the stationery store, saying she wanted to buy a notebook and a pen. They went into the stationery store and Başak got what she wanted. Her father suddenly remembered that they had bought a notebook and a pen for Başak two days ago. "Tell me, daughter, what happened to the notebook and pen we bought you two days ago?" he asked. Başak told her father, "Dad, it's still there, but we tore out the pages and paper airplanes. Still have the pen, though. I won't use them because my friends' pens are nicer and they have nice pictures on their notebooks." Esra, Başak, and their father then went to the market to buy what their mother wanted. When they got to the checkout, Başak immediately prepared two plastic bags in which to put the products passing through the checkout. Seeing this, her father handed the cloth bag he was carrying to his daughter and told her to put the food and drinks they bought in this bag. Put out by this situation, Esra and Başak asked, "Everyone puts it in a bag, why don't we?" The father and his daughters arrived home from the market and were met with the mother's smiling face. As they were about to sit at the table for dinner, Esra's father asked her for tomatoes, peppers, and cucumbers. Esra rinsed them in running water and brought them over. Esra's father told her that vegetables and fruits needed to be washed very well. Esra replied saying, "Just washing off the dust is enough." Her father then asked her, her mother, and Başak to listen carefully and he explained how harmful this behavior was. After dinner, the family drank tea and chatted. After a while, the father examined the electricity, water, and natural gas bills that came that day, and compared the bills of the past months with the latest ones. He told his daughters and wife that they use water, electricity, and natural gas more and more each passing day. Then his daughters said, "Dad, you are so stingy!" Their father told his daughters, "This has nothing to do with stinginess, it's about protecting our present and our future." When it was time to go to bed that evening, Esra and Başak asked: "Can you drive us to school tomorrow?" Their father said, "What's happening tomorrow, are we going to stop by somewhere after school?" Then his daughters said, "No, we don't have any plans; we just want to go by car." When their father said, "No, why should we go by car when we

can go by bus," his daughters said, "Dad, you say you're not stingy, but you're hyper stingy." At this, the father got a little angry and said, "Aren't you the one who complains about the pollution of our environment and air?" The next day, after returning from school, Başak said, "Dad, you aren't stingy." When she said that, her elder sister Esra and her father looked at her in surprise and asked what she meant. Başak said that they had covered the subject of "The Relationship Between Man and the Environment" in the science class at school that day and that she understood how much it matched her father's behavior.

References

Campbell, N.A. (1997). *Biologie*. Spektrum Akademischer Verlag. Berlin, Oxford.

Çevre ve Orman Bakanlığı (2008). Çevre El Kitabı. Ankara.

De Haan, G. (1989). Ökologie-Handbuch *Grundschule-Sieben Themen mit* über *100 praktischen Vorschlägen für den Unterricht.* Beltz Verlag. Weinheim und Basel.

De Haan, G., Jungk, D., Kutt, K., Michelsen, G., Nitschke, C., Schnurpel, U., & Seybold, H. (1997). Umweltbildung als Innovation. Springer Verlag. Berlin, Heidelberg.

De Haan, G., & Kuckartz, U. (1998):*Umweltbewusstseinsforschung und Umweltbildungsforschung:* stand, Trends, Ideen. In: G. de Haan, U. Kuckartz (Hrsg.): Umweltbildung und Umweltbewusstsein. Opladen

Diekmann, A., & Preisendörfer, P. (1992): "Persönliches UmweltverhaIten. Diskrepanzen zwischen Anspmch und Wirk-lichkeit". Kölner Zeitschrift (Ür Soziolo-J!ie und Sozialvsvcholo$lie, 44, 226-251.

Erten, S. (2000). Empirische Untersuchungen zu Bedingungen der Umwelterziehung -ein interkultureller Vergleich auf der Grundlage der Theorie des geplanten Verhaltens-. Tectum Verlag. Marburg.

Erten. S. (2002a). Kız ve Erkek Öğrencilerin Evde Enerji Tasarrufu Yapma Davranış Amaçlarının Plânlanmış Davranış Teorisi Yardımıyla Araştırılması. *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi*, 22, 67-73. Ankara.

Erten, S. (2002b). Research on Environmentally Beneficial Behaviours in Primary School Students. V. National Science and Mathematics Education Congress. METU. Ankara

Erten, S. (2003). 5. sınıf öğrencilerinde" çöplerin azaltılması" bilincinin kazandırılmasına yönelik bir öğretim modeli. *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi, 25*(25).

Erten, S. (2004). Çevre eğitimi ve çevre bilinci nedir, çevre eğitimi nasıl olmalıdır? Çevre ve İnsan Dergisi, 65/66.

Erten, S. (2005). Okul öncesi öğretmen adaylarında çevre dostu davranışların araştırılması. *Hacettepe Eğitim Fakültesi Dergisi, 28*(28).

Erten, S. (2007). Insights to ecocentric, anthropocentric and antipathetic attitudes towards environment in diverse cultures. *Eğitim Araştırmaları [Eurasian Journal of Educational Research], 33*, 141-156.

Erten, S. (2008). Insights to ecocentric, anthropocentric and antipathetic attitudes towards environment in diverse cultures. *Egitim Arastirmalari - Eurasian Journal of Educational Research. 33*, 141-156.

Erten. S. (2002). Kız ve Erkek Öğrencilerin Evde Enerji Tasarrufu Yapma Davranış Amaçlarının Plânlanmış Davranış Teorisi Yardımıyla Araştırılması. *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi,* 22:67-73. Ankara.

Erten, S. (2012). Türk ve Azeri öğretmen adaylarında çevre bilinci. *Eğitim ve Bilim*, *37*(166), 88.

Erten, S. (2019). *"Sıfır Atık" Projesinin İlköğretim Fen Programlarına Uygulanabilirliği* International Conference on Science and Education (IConSE), October 26-29, 2019, Antalya/Turkey

Erten, S. (2020). *Fen ve teknoloji uygulamalarının çevreye etkileri. Teknoloji ve elektromanyetik dalgalar*. Güven Yıldırım, E. & Önder, A. N. (Ed.) *Senaryolarla desteklenmiş fen ve teknoloji uygulamaları*. Anı Yayıncılık.

Erten, S. (2019). Çevre ve çevre b*ilinci.* Aydoğdu, C. & Kıngır. S. (Ed.) *Fen* Öğretimi. Nobel Yayıncılık.

Frey, D., Stahlberg, D., & Gollwitzer, P.M. (1993): "Einstellung und Verhalten: Die Theorie des Überlegten Handelns und die Theorie des geplanten VerhaItens". In: Frey, D. & Irle M Hrsg.): The-orien der Sozial-psychologie.Bem u.a.

Gräsel, C. (1997): Problemorientiertes Lernen: Strategieanwendung und Gestaltungsmöglichkeiten. Hogrefe.

Kiziroğlu, İ. (2004). *Genel biyoloji, canlılar bilimi*. Okutman Yayıncılık.

Martens, T., & Rost, J. (1998). "Der Zusammenhang von wahrgenommener Bedrohung durch Umweltgefahren und der Ausbildung von Handlungsinten-tionen". *Zeitschrift für Experimentelle Psychologie, 45*, 4, 345-364

Sciama, Y. (2007). Klimaerwärmung: Es ist höchste Zeit. Research-eu, Magazin des Europoischen Forchungsraums. Nr.52. Europäische Kommission.

Yuzuak, A. V., & Erten, S. (2018). An evaluation of science teacher canditates' energy saving behaviour intention based on theory of planned behaviour. *International Journal of Environmental Education, 8*(2), 123-149.

Wortmann, K., Stahlberg, D., & Frey, D.(1988). Energiesparen. In: D. Frey; GB. CarI & D. Stahlbei", (Ursg.): *Angewandte Psvchologie,* 299-316. München/Weinheim.

Wotmann, K. (1994). *Psvchologische Determinanten des Energiesnarens.* Weinheim. web: https://bienal.iksv.org/tr/16-istanbul-bienali/yedinci-kita

About the Authors

Sinan ERTEN, PhD, is Professor of Faculty of Education Department of Mathematics and Science Education at Hacettepe University in Ankara, Turkey. He holds a PhD in Didaktik Der Biyologie from Justus-Liebig Universitaet Giessen of Germany. His main area of interest is the study of environmental education, teacher education and sexual health education. serten@hacettepe.edu.tr

Similarity Index

The similarity index obtained from the plagiarism software for this book chapter is 8%.

To Cite This Paper:

Erten, S. (2021). Environment, Environmental Education, Environmental Awareness and Environmentally Friendly Individual. In S. Erten (Ed.), *Different Perspectives on Environmental Education* (pp. 1–27). ISRES Publishing