

**A Study of the Influence of an Intervention on
Environmental Education/Awareness and Behavior on
Middle School Students in the UAE.**

دراسة عن تأثير التدخل في التعليم البيئي / الوعي والسلوك على طلاب
المدارس المتوسطة في دولة الإمارات العربية المتحدة .

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Dedication

This dissertation is dedicated to my loving parents. Their love, encouragement, supports and continuous trust has helped me push through difficult times.

Special thanks go to my sisters who have always believed in me and gave me inspiration to be a better version of myself.

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Abbreviations

EE: Environmental Education

FE : Future Education

RBE: Restoration-Based Education

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Abstract

The environmental issues have become a great concern for many nations recently. It is the vision of UAE and its wise government to address such problems and concerns to protect the environment and to preserve the natural resources of the country. Unfortunately environmental issues are not a subject under study in schools. This dissertation aims at finding the amount of awareness raised among middle school students about critical environmental concerns after a period of classes that lasted for two weeks. The students were pre-assessed through a test about environmental issues to measure their degree of awareness of the issue, and the next step was to provide instruction for them in a two weeks course about the environmental critical concerns. The students were given the test again to do it after their new knowledge, and the results of the two tests were compared. The students were given later a survey to have insights about their opinions about the whole process of introducing environment based course content into their school curricula. The results of the study indicate noticeable increase in the students' awareness about environmental issues after a two weeks intervention course about EE and the students reflected that they are interested in the practical side of the course. The study concluded that EE is essential and it should be integrated into schools' curricula.

ملخص

أصبحت القضايا البيئية مصدر قلق كبير للعديد من الدول في الآونة الأخيرة. ومع أن دولة الإمارات العربية المتحدة وحكومتها الرشيدة لديها رؤية لمعالجة هذه المشاكل بهدف حماية البيئة والحفاظ على الموارد الطبيعية للبلاد، ولكن للأسف فإن القضايا البيئية لا تعتبر مادة دراسية في المدارس. وتهدف هذه الأطروحة الى قياس مدى زيادة الوعي بين طلاب المدارس المتوسطة حول القضايا البيئية بعد كورس استمر لمدة أسبوعين. وكان قد تم تقييم الطلاب من قبل هذا الكورس من خلال اختبار حول القضايا البيئية لقياس درجة الوعي بهذه المسألة، وكانت الخطوة التالية هي توفير كورس مدته أسبوعين عن القضايا البيئية الحرجة. وقد تم اعادة الاختبار مرة أخرى بعد توفر معلومات الكورس الجديدة، وتمت مقارنة نتائج الاختبارين. وأيضاً قامت الباحثة باعطاء الطلاب استبيان في وقت لاحق حول آرائهم بإدخال كورسات عن البيئة داخل المحتوى المقرر في المناهج المدرسية. وتشير نتائج الدراسة إلى زيادة ملحوظة في وعي الطلاب حول القضايا البيئية بعد كورس مدته أسبوعين ركز على القضايا البيئية وتفضيل الطلاب للجانب العملي من الكورس ولذلك تقترح الباحثة اضافة التعليم البيئي الى مناهج المدارس.

Chapter One: Introduction

1.1 Background to the Study

No one can deny that environmental education (EE) is becoming an urgent need in the school context nowadays. This need arises from the fact that change in behavior especially among school students will be highly significant in protecting the environment and developing the appropriate habits among school students who are considered the core of society. The need also is reflected in the fact that policy makers especially in education both in the present and the future should endorse the knowledge, attitudes and skills to have environmental responsible behavior. Environmental education was first realized in the seventies. According to Carter & Simmons (2010), “Since its rise to relative prominence in the 1970s, it has often been misunderstood with regard to its exact definition, its origins, its objectives, and its goal.” In recent times, people started to realize its importance, and fortunately, in the current time, there is an ongoing debate globally on how to reach these objectives and there is a search on the best strategies to come up with educational programs about the environment (Carter & Simmons, 2010, p. 1). Many authors have positive and optimistic views on environmental education in terms of the results that such type of education can contribute to and the targets that can be achieved. For example, in many countries the need of environmental education is discussed and it came to the implementation stages. The best thing about that idea is that results are starting to emerge and they are mainly positive. It is true that there are many challenges to be faced and issues to be resolved, but the world is keen on overcoming any problem just for the sake of our future generations.

The challenges are mainly summarized in the need to increase awareness about the importance of environmental education and to do more research in the field. In general many educators strongly believe in the potential of this type of education to make members of society appreciate the environment more and become concerned with its protection.

1.2 Problem Statement

The research topic of the current dissertation is about environmental concerns and the degree of awareness about those concerns among school students. Currently our environment is facing many challenges and many species are subject to extinction. Earth population in the different places should be aware of the environmental issues such as wildlife issues, climate change, and recycling. Unfortunately many people especially the younger generations do not pay much attention to environmental issues. They sometimes cause a lot of damage in addition to their ecological footprint without even noticing (Gardner & Stern, 1996).

The human activity on our planet causes a lot of destruction and damage; the balance in the seas is affected because of wastes and pollution. In addition, the atmosphere is changing to be worse every day because of our factories and airplanes. There are also environmental issues with war, energy, overpopulation, genetic engineering, resource depletion, etc. apart from destroying the planet and having no safe place to live in, the new generations are losing their food resources and threatened by several diseases. Scientists believe that if people act now, there is a high possibility to avoid the negative outcomes that might arise as a result of the environmental issues (Gardner & Stern, 1996).

Knowing about such issues among the young population is essential to raise a generation who cares about the environment in every step and to make informed decisions. Therefore, it is essential that people become aware about such topics to protect our earth, fight pollution and combat deterioration. The main objective is to provide a sustainable environment for us and for the future generations (Grossman & Krueger, 1994).

1.3 Objectives of the Study

The purpose of the current dissertation is to examine the amount of awareness obtained by the students after attending a two weeks course about environmental issues and also to explore their opinions about the overall experience. Through my personal experience with my students, I always noticed that they do not care much about the environment. They would leave the light turned on, their devices in the charger all day, they may cut plants, pollute the air, the school's garden, litter, etc. Only few of them seemed to be aware of environmental issues.

The general objectives of this dissertation are summarized in the following:

- Examining the students' extent of awareness of environmental issues and their general background about the environment and the surroundings.
- Studying the impact of EE on the students' knowledge, behavior and attitudes towards their surroundings and towards the environment.
- Testing the students' knowledge after the EE course and see if they enjoyed this type of education or not.
- Exploring the students' opinions towards this type of education and whether or not they think it should be integrated into school curriculum.
- Giving useful suggestions and recommendations for educators and policy makers on whether EE should be integrated into school curriculum or not depending on the data collected and the results of the study.

1.4 Rationale of the Study

The rationale behind choosing this topic arises from the fact that environmental education is not taught or considered in schools in the UAE as a mainstream subject. As an experienced teacher, I strongly believe that teaching and learning is about changing ideas and attitudes. Furthermore, learning is essential to build new generations. In my opinion, the idea of saving energy and saving planet earth should be a main concern in schools and they should adopt this idea. As a biology teacher I always noticed small behaviors among my students regarding the environment and the energy. Some of them are reluctant to switch off the light if he /she are the last to leave the class. In addition, they don't care about the separation of the garbage bins and they would through papers in the bin of plastic and vice versa. Saving the energy is not a main concern for them and they do not know much about the topic. I noticed that in the washroom, it is not important for them to switch off the taps tightly. They are only attentive when it comes to saving the dolphins or the extinction of Bluefin Tuna because they came across those subjects during the time of their study.

When I tried to tell them about the benefits of saving energy or keeping the environment clean, they did not take the matter seriously. I asked some of them about general

information concerning the environment and to my surprise they were not informed about the subject. Knowing that the students' behavior and attitudes towards the environment will cause positive changes, I tried from time to time to inform them about the issue and draw their attention about small changes that might have great impact. I also noticed that environment issues are not present in any school subject and that there is not enough focus on them. Therefore, I was thinking if such environmental issues were integrated in their curriculum, their attitude and behavior would change or not. I searched in the literature about previous studies that revolve around the same idea, and I found several studies conducted in western countries. That was the time when I decided to conduct a similar study among the students who I am currently teaching in my classes and my target was Arabs. My current dissertation should shed light upon the current knowledge and information of the middle school students and the impact of teaching them the importance of environment and how to avoid damage to the environment and another aspect is to examine the impact of that knowledge on their behavior. This comes in accordance with the study of Hungerford & Volk (1990) about changing learners' behavior through environmental education.

1.5 Significance of the Research

The UAE, with the vision of His Highness Sheikh Mohamed Bin Rashid Al Maktom is trying to find out several ways to have a proactive statement towards sustainable energy and saving energy. Previous studies in the same field (as illustrated in the literature review chapter) used quantitative methods mainly to do research in the field of environmental education and the main objective was to control the different variables to be able to discover the determinants of people having appropriate environmental awareness. However, after that, there were major changes in the environmental education research basics, such changes remained prominent in the current literature although it is clear that the field is changing all the time. Nowadays more educators and more research and a good percentage of this research is funded around the world by major organizations. This links between the empirical research and the practice in real life are established and many institutions focus on the results of this type of research. There is also an increasing number of international events, academic journals, seminars and

conferences on the same subject and the themes discussed are becoming more diverse. In all those studies, the social aspect of this type of education is being considered and studied as well. It is true that the world is giving too much attention and focus on this type of research, however, the results are still not reliable enough so the door is still open for more research and discussion on the topic with the aim of reaching better conclusions.

Although it is difficult to do comprehensive assessment for environmental education at this stage, but this Dissertation will help in having baseline information on the school level in that respect. Through studying the attitudes and the awareness level of school students and re-examining the same after a two weeks course, the researcher is hoping that this dissertation may also pave the way for educators and policy makers especially in UAE which is known by its environmental awareness and hard work on environmental issues to insert Environmental education into school curricula.

1.6 The Research Questions

The researcher poses two research questions in this dissertation. The two research questions were based on the fact that the researcher needs to know the importance and the impact of environmental education on middle school students. Those two research questions were thought to achieve the target of the dissertation. The first research question is: **Should environmental education be taught in biology classes as part of the curriculum?** The main objective of this question is to find out if it is important to integrate environmental education into the current school curriculum or not. The reason for that is that in my opinion that it is actually very important to integrate this kind of knowledge into curriculum because the students should be informed about the topic and act according to their new knowledge to be able to save the environment and contribute in having a sustainable place for the future generations. Their small acts and behavior will cause huge transformations in their surrounding environment and thus will cause a major impact on the environment. The second research question is: **Does integrating environmental issues into the curriculum change students' behavior and overall awareness towards certain environmental aspects?** This research question represents the main objective of the current study because if the students responded positively, this will prove that it is important and essential for EE to be integrated into the school

curriculum. The researcher is specifically of exploring the students' attitudes and behaviors towards the environmental issues after the course period. Will the students' knowledge increase? Will they act responsibly in their own school after that? The researcher designed the tools of research and conducted the study accordingly to get a documented answer for the above mentioned two questions hoping to have answers that are verified through research.

1.7 Dissertation Structure

In general, the structure of the dissertation started with the reviewing the previous literature after giving a background about the topic and the rationale of choosing the topic, then the researcher described the methodology used in doing this study with all the required details and procedures. The next chapter was dedicated to describing the data obtained and the next chapter is about interpreting the data and connecting it to the theoretical framework. The last chapter is dedicated to final discussions and conclusions. Based on the results and its analysis, the researcher was able to give informed suggestions to educators and policy makers on the validity of integrating environmental education into schools curricula as the results of the study proved EE efficiency and usefulness.

Chapter Two: Literature Review

2.1 Introduction

To highlight the issue of environmental education, relevant studies in the literature will be reviewed in the beginning of this chapter and some concepts should also be defined to give the reader a clear background about the topic. This chapter is comprised of four sections with the aim of discussing some important issues like Environmental education, conversation and education, the support of environmental education and finally there is a section dedicated to the related studies. The last section of this chapter will be dedicated to highlight the current study.

2.2 Conceptual Analysis

Children and teachers alike are taught to interact with their environment making wise decisions about it and taking care of it through extensive environmental education (EE). Environmental education is a special kind of education concerned with raising awareness of environmental issues (Stapp, 1969). EE can be taking place anywhere where there is audience. For example museums, parks, zoos, and open areas. It also involves many kinds of science and it is not exclusive for one kind of science such as social studies, geography, chemistry, biology, and arts. Such different patterns of science come altogether to form many vital disciplines in making a full understanding of the importance of environmental education. Other conceptual framework for environmental education include but not limited to theories like the one endorsed by the Belgrade charter which states that there are certain objectives for environmental education, which were highlighted by the Tbilisi Conference; Awareness, Knowledge, Attitude, Skills and Participation to help individuals develop responsible environmental behavior (UNESCO-UNEP, 1976).

Generally the best practice of EE as a teaching material is through organized arranged sequence, since EE reflects the standards of the learning process in all kinds of educational institutes. If the delivery of EE standards is met well, the end result will be amazing regarding the environment itself and the students- personal wise and academic wise - or whoever is affected positively by this process.

People who are literate about environment know or at least are curious about the following: the environment is affected by their daily choices, and these choices can help or harm the environment accordingly (Tilbury, 1995). In addition, they should know what needs to be done by them to make sure the environment is kept well, maintained healthily and the useful recourses in it are sustained well to make sure a good life is the base quality for the coming and current generations.

On the other hand, no one can deny that environmental literacy promotes human health, for example: Certain deceases like cancer and asthma can be avoided if we kept the air clean, clean water keeps away many various diseases and rich soil provides healthy food for everyone and this shall require sustainable farming providence.

Therefore, it is the responsibility of environmental literate people to spread this knowledge and behavior hoping it would be a standard life style sooner or later for the sake of a better world through actions like: buying green products all the time if possible, and using as much natural alternatives as possible over industrial ones. Decisions such as building new households, stadiums, factories or workshops should be discussed deeply within a community meeting to make sure it is not affecting anything like public places, green areas or playgrounds.

Environmental education is important for many significant reasons; first it increases the students' perception and participation in the science subject. It is an example of hands-on learning as the students are learning about the environment surrounding them, they can discover explore and see the change. Research also revealed that if EE is integrated in the science curricula the student's achievement becomes increased in the subject as a whole. EE integration benefits go far than that by increasing the students' achievement in core subjects too. This includes social studies, mathematics and reading. The study by Lieberman & Hoody (1998) revealed that not only EE participated in raising student' achievement, but it was also the main reason behind reducing discipline problems in the classroom and made the students more enthusiastic as well as made the students prouder with their achievements.

Another important aspect is that environmental education is believed to be one of the prominent issues in the next century and that by integrating it to the school curricula; we are preparing a whole new generation or a workforce who are capable of facing the future challenges (Pfirman, 2003).

EE has health benefits too; children and teens who spent a lot of time indoors in front of TV screens or computer screens suffer from a range of psychological and physical problems and disorders. One of the most prominent disorders is called “nature-deficit disorder” and it is usually associated with the lack of outdoor activities. Having the student care about nature and try to discover it and explore it, let alone trying to protect it will add a lot of value to the health and the mental condition of the children (Driessnack, 2009).

As a result of realizing this importance, for the first time ever in USA, Environmental Educational was made important in federal policy in the comprehensive K-12 education bill that the Senate would be passed to. It’s going to be the main topic for the House-Senate reconciliation negotiations schedule for this fall supposedly. There are many basic and fundamental differences between the House and Senates’ version, The Senate version is restricted to a specific number for different programs and populations, while the House is the same idea but it grants more blocks for the designation of the programs / members when it comes to funds profile. However, educators and leaders have a strong wish to have the education bill after the many years of delayed action.

In regards to other countries, the environmental education is either already integrated in the curricula or at the stage of being seriously considered to be integrated. An example of countries that already integrated the EE in its school curriculum is Nigeria; they have introduced a subject called Citizenship into the formal education system. This subject is taught at the primary and the secondary level according to Adedayo & Olawepo (1997). In addition, similar integration was also done in Tanzania (Kimaryo, 2011) and the European Union (Stokes, Edge & West, 2001). According to (McCormick, et al. 2005) UAE has participated in the Young Masters’ Program which is a program designed for young people aged 15-18 to learn about the preventive measures to protect the

environment, and this reflects the awareness of UAE government and the desire of having a sustainable environments for the future generations; however, the researcher was not able to find any study that is done in UAE before to examine the importance of EE and its integration in school curricula.

2.3 The Theoretical Framework

The theoretical framework endorsed by this dissertation is Hines’ model of responsible environmental behavior. The model is efficiently showing the basic elements and the factors for promoting responsible environmental behavior as follows; people’s attitudes, control and personal responsibility drives them to the knowledge and the action skills needed to be environmentally aware and hence responsible for their personal behavior. Another element that is also important is the personality traits for each individual. All of these factors along with other situational factors lead people to have the intention to act and acquire the responsible environment behavior. Hines’ model is crude and it contains various variables however, the criticism against this model was mainly because the researcher failed to determine the relationship between the various variables presented.

In the following, Figure 1 illustrates the Hines’ model:

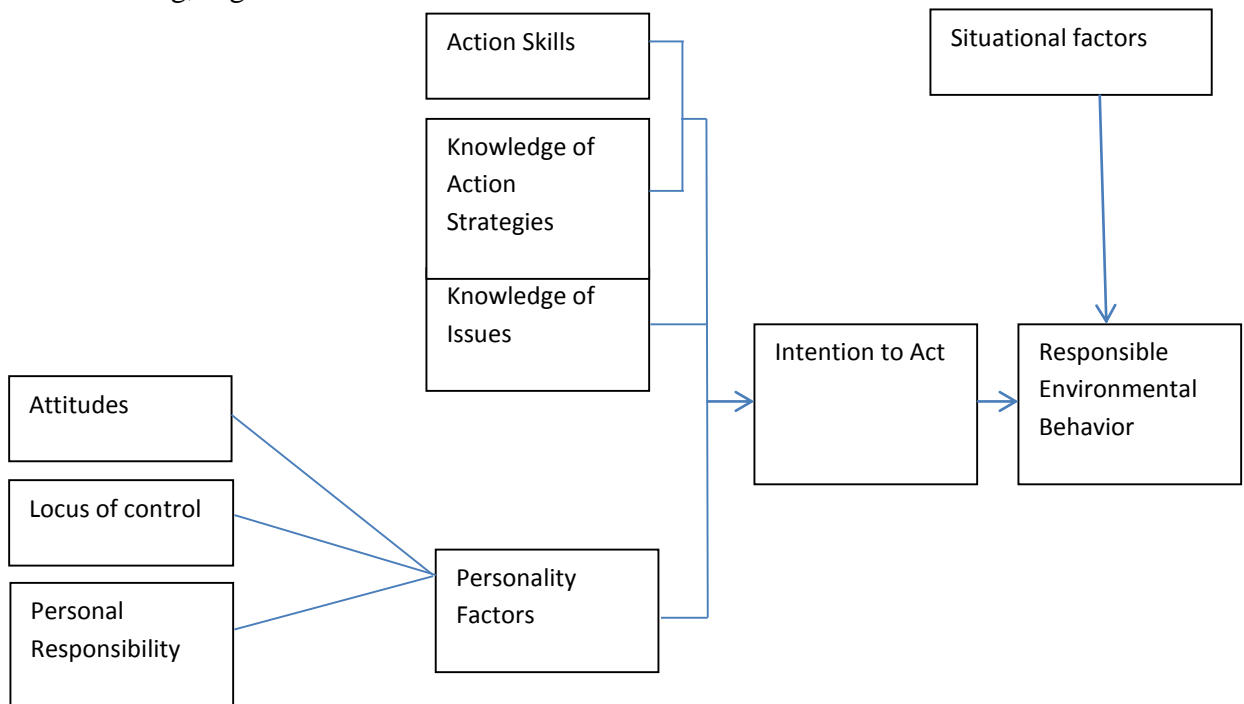


Figure 1: Hines model of responsible environmental behavior (Hines et al., 1987)

Hines et al. (1986/87) revealed that a person who has the intention to act is more likely to do that action than the person who does not have any such intention. That's why the intention to do something or to act is seen to be a more precise predictor of responsible environmental behavior. Hines et al. also mentioned that through their research they discovered that having the ability alone is not enough for individuals to act. Being informed about the topic and having the knowledge of citizenship are said to be the most important factors in driving people to act. The skills needed to benefit and use this knowledge were also found to be essential to increase the ability of people to act and there were also some personality traits that are involved in the success of the process. Hines et al. (1987) also found other factors such as social, economic aspects and those factors also influence peoples' ability to act either positively or negatively. This theoretical framework will help the researcher to find out the factors that will lead the middle school students in UAE feel responsible, act or not after the two weeks course which is focusing on environmental education.

There is also the theory of Palmer (1998) who introduced the UK model of environmental education in the following: "education about the environment...in educating from (in) the environment...to be education for the environment..."(Palmer, 1998). While Rao (1997) recommended four bases for environmental education; which are learning for knowledge, learning for doing, and learning for living together. These different conceptual frameworks helped the researcher to acquire the knowledge needed to analyze the study's data. On the other hand, the model of Hungerford and Volk's (1990) that stated three main categories of variables, each category targets explanation of responsible environmental behavior; entry level variables, ownership variables and empowerment variables (Hungerford & Volk, 1990).

2.4 Review of Related Studies

In general, pedagogical studies showed that we need more variant work of the research approach of environmental educational systems and how to assess and evaluate our ways of measurement when it comes to elaborating the need of environmental education and its impact on the entire study geographically and socially through different theories

practicing them daily on basis historical and environmental wise taking in our consideration the participation process of mythology samples (Payne, 2006).

In UAE research about environmental education is still growing. However, there are many studies that revolve around the idea of environment protection and sustainability. One of which is the study of (Jahamani, 2003). The focus of the study was on UAE and Jordan as an example of developing countries that care for sustainability and have a degree of environmental awareness, involvement and the ability to report about environmental issues.

To highlight more studies about EE, the researcher reviewed the literature about the subject from various research articles mostly peer reviewed. First, there was a study held in Ankara in 2008 that showed the ecological relation between the environmental study for students – 38 males and 26 females for a total of 64 students in elementary schools – the results showed a noticeable intense effect on the students regarding their behavior with nature, the more information they got in their studies regarding nature and environment the more they are affected positively in dealing with it. The students showed improvements in their knowledge and behavior regarding the environmental different changes taking place. The before-after test studies using ANCOVA and t-test methods showed those effects even though some after-test results were different than the before ones, still the importance of such studies showed up in the score sheet as good indicating numbers (Erdogan, 2011). This study in particular seems to be directly related to my dissertation as the purpose and the methods used were very relevant.

Moreover, Guler & Afacan (2012) mentioned that to sustain or not a good educational system regarding the environment, a test took place in the late 70s, so that we can scale how important is it to improve environmental education systems when it comes to forth seeing the future without the need of using any not-so natural resources. A good environmental system according to the authors is to be called “Sustainable” when it raises the standards of positive attitude towards the environment, constructive behavior towards all different variables of setting up a good environmental system through education. The study at Ahi Evran for a total of 409 teachers based upon the 5-point Likert scale consisting of 29 items with a data transferred to the SPSS15.0 then later an exploratory

factor deep analysis was conducted successfully showing a 0.944 result for the Cronbach's alpha co-efficiency factor with a yielding result on a three dimensional scale (Guler & Afacan, 2012).

In addition, according to Redman (2013), to achieve a sustainable future, you need a sustainable behavior at the very beginning of your educational life, such statement needs to be put to the test to measure that effective environmental wisdom against the usual traditional educational systems, as many programs might focus only on one side of the coin – teacher centered educational methods and techniques – totally ignoring the fact of behavioral and sustainable practices of students highlighted as one of the key factors of making a so positive change in the main process of improving the environmental educational system. Redman (2013) mentioned that to fill this gap an interdisciplinary approach of three dimensions – educational pedagogy, sustainability competencies and behavior changes a small amount of students for over a yearlong study through summer courses were tested on, the data collected through interviews, surveys, videos and deep observations of the participants regarding their food and waste behavior, real world behavior and problem based methods showed very vast significance in the results of dealing with environment and behavior about it, but some results varied like the results of food changing habits was a bit harder to change in terms of waste decisions and that might be due to cultural and social environment.(Redman, 2013).

In another paper by Brymer & Davids (2013), which is about the argue about the importance of supporting an ecological dynamic methods of environmental education system focusing on the relationship between the learner and the environment not only a one side study, more about the different dynamics ecological factors that can change the behavior of persons towards the environment physiologically towards a dynamical systems theory. To design such effective environmental program for the core cause of learning in an interactive way between educators and learners the key factor is to tamper environmental constraints in the learning process itself by providing generic original principles of education will be the main definition of the process of executing the environmental education programs (Brymer & Davids, 2013).

On the other hand, Carmi (2013) states that to protect a long time investment sometimes a short run one must be dropped, to reflect such a thing on the importance of environmental education, he found out that there are so many health behaviors that might be not the so-friendly comfortable ones to do are the best to deploy to ensure a brighter future health wise for a better well-being, to achieve such a long term a future orientation is developed both health and environmental wise measured by Zimbardo's time perspective inventory (ZTPI), a 333 undergraduates went under that study and the results were different from one another, the students who were so FO (Future Oriented : doing the formula of dropping hard patterns of behavior in favor of better long run health and psychological behavior) didn't show any strong change of attitude towards that approach, it only worked out for them if it matches the thinking pattern they got for their personal benefits on the run, so the study result suggested that the future of educational systems environmentally might be variable according to personal benefits after all, more details about that point in particular were mentioned in the study itself (Carmi, 2013).

Furthermore, Hines, et al. (1987) mentioned that even though there is a vast amount of information and a big swarm of metadata when it comes to the study of environmental behavior but we are still far from putting our hands on the key factors of making the root of all changes to such human behavior on the level of treating the environment well through environmental education or awareness, a very strong study was carried out to study such a theory and to try to get a closer look at this approach through an extensive research based upon digging up the information tentatively based upon the meta-analysis of the results of previously done researches regarding the environmental behavior, it was found out that some factors play an important role in general when it comes to this study: knowledge of issues, knowledge of action strategies, locus of control, attitudes, verbal commitment, and an individual's sense of responsibility. A model of predictors of environmental behavior is proposed (Hines, et al. 1987). This study served as the theoretical framework for my current dissertation as it is dependent on the Hines model of responsible environment behavior.

Moreover, in a book about Restoration-based education (RBE), it was mentioned that this type of education can create a "learning backbone to enhance biodiversity and get in

contact significantly with learners and the place they are living at" This book is about living samples of civic ecology, and community greening programs and school greening. Mixing those samples and their results with the practical and academic studies concerning literature RBE, the Author could realize that having as many people as possible involved in this from different ages is important in restoring native habitats specially that people taking out the educational prospect of the EE can give support for individual (Participation of the community in EE Activities) and ecological (health and status of the ecosystem aka environmental influence) outcomes (McCann, 2011).

According to D'Amato & Krasny (2011), there is also the Outdoor Adventure Education (OAE) which are programs specially tailored to enhance the personal growing process by facing the harden ship youth meet in their daily life challenges, such as, sailing, kayaking and rock climbing. People who participated in such events said the impact of such activities was so great on them, their behavior and even actions towards the environment and the people in their society. 23 former OAE participants were interviewed to investigate how their significant experiences improved their personal growing process and how their environmental behavior changed by analyzing the data using the aspects of transformative learning theory, – the researchers found out that the samples in the experiment showed results indicating that "being part of the intense daily tasks of social activities with different life styles on the running course including all its challenges would improve the environmental behavior in general and boost the positive attitude towards the importance of keeping the environment in a healthy cultivate shape.

Furthermore, in an interesting study by researchers in the UK who examined the benefits from a pedagogical point of view of broadcasting daily podcasts about science and geography for students and undergraduates in the university, they have mentioned that 24 students in the "Biography and Conservation" course saw Many video as an online podcast or can be downloaded to any mobile devices. Podcasts were the tool used to let the students know about the dynamics and structure of theories about conservation taking these experiments in places like rain forests and deserts where students had so tiny pieces of info about or not experience at all, through questionnaires, essay assessments and focus groups research result was: students supported the view that the podcasts were

beneficial in learning and teaching during the time of the course that offered a different experience in learning. The podcasts were also seen as a good asset for revising and for the final assessment as they provided visual images and added to the overall knowledge.

(Hill, & McInerney, Smyth & Down (2011) aimed at providing a good chance for students to say their word when it comes to how and what they learn, therefore, they revised the theoretical basics of the foundation of place-based education (PBE). They suggested that the main value of PBE in schools is to come up with chances for young people to learn about and take care of the society where they live from social and ecological principles at and the need to connect educational institutes with communities as part of a buildup effort to improve student engagement and participation (McInerney, Smyth & Down 2011). Furthermore, they argued that perspective in PBE encourages youth to deeply relate local many issues to global environmental, political and social matters, such as trade, water scarcity, climate change and poverty. At the article ending we found out that the authors propose several approaches to ease critically engaged forms of learning: Students can say their word when it comes to what they learn, for young people, they are encouraged to face the big challenges when it's about the global community. The researchers also concluded that relational trust should be built within schools and communities; to push students towards building their own ownership, belongingness and identity and to allow more space for conversations including political and social topics. Finally, it was important to establish an ethical commitment to justice. The research literature suggests that organizations should provide behavior conservations by adhering to steps which are considered in social marketing and other vast techniques.

In addition, there was another study that is conducted by Monroe (2003), who made use of the literature that is based on behavioral environmental education and chronological life experiences to note down two important points that play a very vital rule in gaining more responsible environmental behaviors, marking and following a specific change of behavior, and increasing environmental literacy educational programs. Based on this literature, Monroe (2003) has also recognized the following strategies that could be useful in environmental literacy and may act as a teacher and even a leader for environmental education programs to increase the awareness of conservation behavior for

learners: using very interesting case studies and success stories of other environmental heroes and community leaders, taking part in project-based environmental issue solving reinforcement for environmental values from all kinds of different resources, usual and redundant experiences in nature starting from being a kid, opportunities for children to find out and play in nature, partnerships with different other people who may act as teachers and could be their friends, family or neighbors, investigating issues and resolving them, providing different information about the environment, environmental problems, and the results of human behavior, creating connections between the various aspects of an issue to more deeply understand the options and results; and making it easier to acquire and practice of action skills both politically and ecologically (Monroe,2003).

Marouli (2002) issued another literature review which shows that worldviews of unrecognized people has been decreased badly in Education and that our original understanding of environmental problems and the suggested solutions are narrowed due to the perceptions of the dominant group (Marouli, 2002). The author said that being exposed to cultural diversity, pedagogy, and community playing part in such activities are very important pillars of multicultural environmental education. She made interviews with teachers in non-profitable organizations consulting EE about their ideas and daily based activities. Most of their programs focus on the EE in places like USA and Canada. methods in these organizations greatly are very different from Activities showing people of different ethics how they handle the EE throughout their professions and exploratory learning and making up gardens, results indicating that these programs highlight such targets as multi-cultural understanding, environmental connection with the environment, and environmental provided service. One of suggested solutions based on interviews is that the different points of views need to be acknowledged and utilized in the study of the environment showing the importance of innovative solutions to environmental problems.

Some test subjects of this study showed many features that make EE in cross-cultural contexts different from other shapes of EE, including research for society problem

solutions, using an array of different languages, fight for one's eco-social rights, and focusing on people more than on the environment.

In general, researchers found out the need for an inter-generational approach in increasing the awareness in middle school students by mixing farming activities with the school ongoing curriculum. In a study by Mayer-Smith, Bartosh & Peterat (2009), for more than six years in Vancouver, Canada, more kids were participating in organic food growing, worked altogether with teachers, university students, and community members who volunteered and gardeners at organic farm. Program points included all kinds and phases of farming process such as planting, soil testing and harvesting, some of outing sports forest walks, and conversations about environment and food security. A research approach was followed so as to carry out both research and the program evolution. Coming based on six years of detailed observations and interviews of the youth and adults, researchers showed out that we need increasing practices to understanding of ecosystems were very unusual for different children. They found that promoting understanding of the "relating healthy eating and keeping an ongoing healthy earth" is very hard because "the basics are broad and abstract". For many different children "the social, sensational, and intergenerational contexts and experiences were more powerful, memorable and remarkable more than the environmental and scientific learning." Some participants considered "social, artistic and intergenerational experiences," and not the regular science topics, as the main rewards for participating in the farm program. But this program high-lightened appreciation of working in a different, cross-generational environment and helped the ones who participated to learn more about the environment within a real life time context (Mayer-Smith, Bartosh & Peterat, 2009).

2.5 The Present Study

In the present dissertation, the two research questions chosen were based on the need to know the importance and the impact of environmental education on middle school students. The first research question is: Should environmental education be taught in biology classes as part of the curriculum? Studies such as of Redman (2013), Guler & Afacan, (2012), and Erdogan, (2011) showed that EE is an essential part of schools education. The second research question is: Does integrating environmental issues into

the curriculum change students' behavior and overall awareness towards certain environmental aspects? Studies such as of Carmi (2013) Brymer & Davids (2013) noted a significant change in the participants' behaviors towards the environment. The two questions along with their hypothesized answer and the conclusion reached after doing the current research study will lead the educators and the policy makers to act and to play their important role in adding environmental education to the curriculum. This way they will make huge contributions to the welfare and the protection of the environment through raising awareness to generations of students who will be raised with awareness and respect for the surrounding environment. Based on the theoretical framework of the current study, the researcher determined to use the Hines' model (1987), Palmer's model (199), Hungerford and Volk's (1990) model as the backbone of the research to highlight the fact if the students behavior will change into being responsible or not. The various factors that might contribute to the change of behavior are studied through the pre-test, the post-test and the survey. The theoretical framework indicates that there are various factors that lead to responsible behavior towards the environment. Therefore, the model chosen helped the researcher determine some factors while designing the questions of the tests and the survey.

2.6 Summary

The literature about environmental education is very rich and dynamic, most studies and books in the field confirmed the importance of environmental education integration in school curricula. The impacts of having this type of education are very prominent as not only they change the students' attitudes towards the environment but it also invites them to act accordingly and protect the environment and their surroundings. Integrating this type of education into the schools curricula according to previous studies is a huge step; however there was a necessity to do the current study on residents and citizens of UAE because the nature of each country varies. On the other hand, UAE is known for its care about the environment and sustainability. In fact there are huge projects in this field and a lot of attention is given to the matter in general by the government.

Chapter Three: Methodology

This chapter will be about the methodology used in the current dissertation and the rationale of using them. There will also be a separate section to describe each instrument used.

3.1 The Research Approach

In the current dissertation, a quantitative method will be used in attempt to answer the two research questions posed in this dissertation. It is true that, the researcher will depend more on quantitative methods in the data analysis; however some test items or survey items will be analyzed qualitatively. The choice of quantitative methods is due to the nature of the research which requires a pre-test, a post-test and a survey to get a comprehensive answer for the research questions. The two research questions posed are first; should environmental education be taught in biology classes as part of the curriculum? And the second research question is; Does integrating environmental issues into the curriculum change students' behavior and overall awareness towards certain environmental aspects?

Previous research about the same subject used different methods but in general researchers depended heavily on the use of quantitative methods because it was the best option for this kind of empirical research. The aim of this type of research is to check if there are practical and significant changes in the students' behavior after receiving EE. In the current dissertation, a test will be given to student before and after learning about certain environmental concerns. The students would learn about environmental issues for a period of two weeks. The researcher “and the biology teacher” would be the coach or the facilitator for the course given about the environmental issues. Second, the students are given a survey to receive and assess their feedback about the whole process. Answers will be compared before and after the test and through the answers we would tell if thoughts and behaviors have changed significantly or not as a result of Environmental education (EE). All methodologies have their weak points as well as strong points; therefore, the researcher is hoping that through using quantitative methods, the results of the study will be more accurate and comprehensive to give educators and policy makers'

insights about the importance of integrating environmental education of EE into the school curricula.

3.2 Research Design

In education research, it is always important to focus on the topic of the research to obtain the best results. Therefore, it is important in this type of research to combine qualitative and quantitative methods to be able to analyze the data in an effective way. In education research, it is always important to focus on individuals and to know their attitudes as well as their need towards the subject that is being examined (Joy 2007). The main objective of education research is to improve the process of teaching and learning inside the classroom no matter what is the subject or the discipline taught. The choice of qualitative or quantitative methods depends heavily on the required outcome and the subject of the research; in fact, it is the researcher duty to find out which method will lead to efficient results when designing his/her piece of research. Numbers and statistics data are useful and efficient in giving a broad picture about the topic from the selected population. Many researchers resort to computer software to help them in quantitative research especially research with large samples and in this case qualitative methods helps in giving statistics so researchers can reach generalizations (Creswell 2002).

However, no one can deny the importance of qualitative methods and its role in a thorough understanding of the results (Merriam1998). So, quantitative methods are usually beneficial in examining phenomena that cannot be measured through numbers and needs more rational analysis. It is then possible to say that the results and the analysis obtained through each method is different and in many instances they complete each other. Both kinds of methods have its strength and weaknesses but in research it is difficult to separate them from each other. According to Johnson & Onwuegbuzie (2004) mixed methods in research are inevitable in our current time. On the contrary, they represent a must to enable the researchers of getting accurate data regarding their research and to address different aspects and angles of the same research topic.

In this dissertation, the researcher decided to use quantitative methods to get a comprehensive look on the students' opinions and the extent of their awareness of the benefit of environmental education. In the pretest and the post test, there were some

demographic data collected at first, and then quantitative methods were used to analyze the results depending on the students' answers. All the questions in both tests depended on multiple choice answers. In the survey, mostly quantitative methods were used while the last question only was analyzed using qualitative methods. In general, in this dissertation the researcher depended more on quantitative methods to analyze the data.

3.3 Data Collection

To collect the data for the current dissertation, the researcher designed a pre-test, a post-test and a survey (see appendix I, II, III). The pre-test was initially given to the sample population and they were asked to answer the questions according to what they know, then a two-week course was given to the students, and finally they were given the post-test and the survey.

3.4 The Sample Population

The population for this study is extracted from one UAE school where the medium of instruction is English. The school is a private k-12 co-education school in Abu Dhabi and it has around 2500 students. It was established in 1987. Students chosen for this study were middle school students. As the author of this dissertation and being a biology teacher, The researcher have chosen a sample from the classes she is currently teaching to conduct the research in the hope of getting comprehensive answers to benefit other educators and policy makers. The reason behind choosing students from my classes is that the researcher knows them and they know the researcher so that should facilitate the whole process. The researcher also has a good understanding and knowledge of their academic abilities. The sample has been chosen randomly from middle school students and from the classes the researcher has been teaching so both parties are familiar with each other. The sample population chosen represents middle school students in similar language schools.

The sample number is 174 students from both gender males and females; 92 male students participated in the research as well as 82 female students aged between 11-13 years old. The sample population was chosen randomly. The nationalities of the participants varied between students from Egypt, Lebanon, Jordan, Palestine, UAE, Syria

and Sudan; therefore, we can say the majority of the students were Arabs. UAE has a special nature; it is a very advanced country that believes in science and at the same time preserves its customs and culture. This special nature has its impact on the citizens and the residents; as they are deeply affected by the vision of their leaders; therefore, although similar studies were done before in this field in different parts of the world, but choosing a sample from a UAE school population was important to get comprehensive results about UAE in specific. To the best of the researcher's knowledge, no such studies were done in UAE before, and this makes this study unique.

3.5 Site Selection

The researcher has chosen a private school in Abu Dhabi to conduct the research for the current dissertation because of many reasons. First of all, this is the place where the researcher has been working for several years. In addition, the researcher knows about the level of the students, the researcher is familiar with their curriculum in the taught subject and the other subjects; therefore, the researcher knows that Environmental Education EE is not covered. Second, the researcher found it easy to access the information needed, to ask the parents' or the guardians' their permission to make the students participate in the research putting the ethical considerations in mind. It was also important to get approval from my supervisor and the school manager, which was easy because they already know about my thesis and they want to support me. My students were also very cooperative in spite of their young age and the researcher found it interesting to explain to them the research idea and the research procedures, in fact their enthusiasm was infectious, and we all ended up having a unique experience during the pre-test, the course itself, the post test and the survey. The researcher believes that if another school was approached, she would face a lot of difficulties in terms of arrangements, time, approvals, etc.

3.6 Instruments

3.6.1 Pre-Test & Post-Test

The researcher has chosen to follow previous studies that have been conducted in the field of environmental education, therefore, the researcher designed a pre and a post-test

to be given to the students before and after the two weeks course. The main objective of the tests is to measure the amount of progress and the extent of knowledge and awareness development for the students before and after taking the course. The researcher found it necessary to read extensively about the history and the methodology of making such type of tests before starting the process. In the following section, the researcher will demonstrate what was found in that regard and the methodology of creating the tests along with the specific guidelines will be explained.

Taking in regard the importance of carrying out an experiment or a research in a measureable methodology, one of the most effective ways is to raise a pre- and post- test, but what is that? It's simply a measurement of the learning received during the class as a result of comparing what the student knew before in a pre-test and after the class experience in a post-test. Usually the use of pre and post-tests is to quantify the knowledge to be attained in the class by a vast different group of students with regard to diverse learning styles and educational backgrounds. More specifically, the tests show how the students are learning in the course. The data will target students requiring extra help and will identify teaching and learning methods that need to be changed or developed (Leeming, et al. 1993).

Performing the pre-test / post-test method on the analysis of 34 different environmental education studies to show the changes in environment when it comes to the persons behavior, knowledge, mindset and attitude and it was carried out in sub-level in-class and out-class programs, the end result showed a very promising and fruitful growth and gain of knowledge that can take place through such extensive process of pre-test and post-test as an assessment for the environmental behavior educational process.

Usually a mix of methodologies is used to carry out or prove a theory or even negate it but no scientific experiment is taking place without the Pre-test and Post-test since it can be – if not considered – the most solid evidence for facts to be measured in the experiment.

There are several reasons for using a pre-test in research; these reasons are summarized in the following; first to examine the background knowledge about the topic that existed

beforehand. Second is to compare with the beginning of a post-test and to allow students to be tested before course with the highest possible accurate correct score. Third, to inform the instructor about needn't topics to cover in the course based on student's previous knowledge or the most important ones to highlight later as a vital point in the course study and to show the student knowledge about the topic in question.

On the other hand, there are also several reasons for using a post-test, these reasons are as follows: to measure the outcome result of the process of teaching the course to the students and to analyze precisely the appropriateness of the learning objectives as a course outcome. In addition, post tests are also useful in recognizing clearly the students who need additional help and to target any instructional needs to improve the course. But sometimes we need not such criteria – pre/post testing – since most assessment instruments measure the student's ability to retain and recall the known facts and do not necessary show any measurable improvement in performance or knowledge.

Pre-tests must take place when a student has some fair knowledge about the topic of the course and not without any background in general. Post-tests should be done directly at the end of the course and also later to test the application gradual process and impact of the learning.

An option to the usual “pre-test before the class” and “post-test after the class” is the “post-then-pretests design. In this design, the learner is asked to first report current behaviors in a post-test and then, their same perception of the same behavior before taking the course (a pre-test equivalent). Because the student is asked their perception of enhanced performance in the same reference of the post-test, some teachers/ professors feel this is a more accurate measurement and the “response-shift bias” in self-reporting is minimized to the least to ensure the best outcome of the experiment in total.

Each pre- and post-test question pattern should be documented for each course's learning list of objectives. To make it easy to evaluate the learning that occurs in the course, you should match the question as similar as the learning objectives. Assuming your learning objective is “By the end of the course, the student will be capable of recognizing successfully the components of a HPI; the question would be to select from the answer

options the components of a HPI or given a clinical vignette or any other example in return, select the components of a HPI (Dettmann-Easler & Pease, 1999).

Pre- and Post- tests showed a vast positive attitude in this experiment of enhancing residential environmental education program, changes took place 3 months after the program initiated and through the process of pre- and post- testing on 6 residential programs in the upper Midwest to assess the program effectiveness in pushing forward or not the environmental behavior education methods, targets and goals specially when it comes to Wildlife.

The questions of the pre-and post-tests should be short, right/wrong and multiple choices or matching the best answers/questions together. The researcher should start with writing ten test items based on the learning targets. If the researcher is unable to write a test one item on the learning objective list of points and items, then they can rewrite the learning Objective from the very beginning. In any test from this type, there should be a checklist to be considered; first, each test should be titled with the course title, instructor, date, time and any meta information for both pre- or post-test process. In addition, tests should measure the acquisition of the learning objectives and both test types should have the same set of items. The test items should be in the correct arrangement and sequence for each test item should be complete with only one question and five answer options. As for the multiple-choice-question test items, they should be numbered 1,2,3 with different options for the answers.

Researchers should not use negative questions (Not, except) unless they intend to make the student to learn a negative answer option. In addition, no marks should be there to indicate a right answer or a wrong answer. Researchers in designing such types of tests should print out a test sample to make sure every question is in place, elaborated enough and the options for the answer are all correct and clear according to the type of the question doesn't matter it's a pre- or post-test.

The tests are collected and the item-by-item answer, the data were extracted and analyzed accordingly. Based on this information, the teacher may want to change the content of the

course to successfully encourage more learning. Any student whose result is poor should be decided and given additional aid.

A true difference or increase in the learning outcomes from pre- to post-test should cover a percentage of at least 30%. After doing extensive reading about the way researcher create and implement pre and post-tests, the researcher designed the tests based on certain guidelines and environment facts. The pre- test consisted of three sections; knowledge, environmental awareness in UAE and finally the environmental behavior. Each section of the test contained seven multiple questions and 4 answers were given to each question for the students to choose from. The first part of the test was dedicated to obtain some demographic data of the participants; they were required to write down their gender, age and nationality. The post-test followed the same structure, and the same sections. The main objective of administering the pre and the post test was to examine the students' degree of knowledge and awareness with the environmental issues before and after the course they have taken. The students were assured that their performance in those tests will not affect their grade in the biology subject and they were asked to answer the questions that they know only. They were informed that this research is performed by the teacher to finish her master's degree requirements in a final dissertation. Some students expressed the difficulty of some test items and that they are not sure of the correct answer, but the researcher confirmed that many people do not know that correct answer and that it is perfectly fine to not to know sometimes. This made the students more comfortable and they decided to answer to the questions they know only.

3.6.2 Post-Survey

The last step after doing the post test in this study was to distribute a brief survey on the students to explore their opinions and attitudes towards the whole study. Therefore, the researcher started by carefully designing a survey that will help to know the insights and the reactions of the student towards the study. Each question in the survey is tested to ensure its useful outcomes upon the completion of the survey. It is a fact that researchers cannot depend on surveys solely in their research because they are not reliable most of the time, however, if they were used in a correct way, they can give good results (Wright 2005).

In addition, there are pros and cons for using surveys; they are cost effective and it is easy to distribute them and collect the results, however, according to Wright (2005), surveys do not give accurate results in terms of the whole population. The survey consisted of nine items, eight of which were statements and the students were asked to choose one of the following five answers: (I strongly agree-I disagree-I don't know- I agree-I strongly disagree).

The first statement was about if the students wanted to discuss environmental issues in class or not. The second statement was about if the students were please about the fact that environmental issues were introduced in class. While the third statement was about if they discussed environmental issues with their families and friends or not after classes. The fourth statement is about any change in their misconceptions and the fifth statement is about their attitudes towards the environment. The next statement was about if they want to learn how to save the environment or not. The last two statements were about the degree if the students want to be involved in the environment and whether they want to receive environmental education in school or not.

The ninth item in the survey was an open ended question to explore if the students have anything in mind about enhancing the quality of the course given or the way it was given and to know if they have any suggestions in this regard. Therefore, the first part of the post survey will be analyzed used quantitative ways while the last question only will be analyzed qualitatively.

3.7 Research Ethics

The researcher started by telling the direct supervisor and the school manager about the intention of conducting research in school. They gave their immediate approval but informed me of the importance of having written approvals from the students' parents or guardians before starting the process. The participants of the current research were told about the purpose of the tests, the course and the survey before initiating the process. The researcher got the parents and the guardians approval before starting the process and spent some time clarifying the matters for both the students and the parents because they worried that this experiment might affect the students' grades in school. The researcher made the parents/guardians sign on a written form, however, the consent of the students were only taken verbally after describing the research and its purpose. The students were

informed that they can accept or refuse to participate in that experiment and that this will not have any effect on their current study. Eventually, researcher stressed the fact that participants' identities, the tests and the survey responses, and the name of the school will not be mentioned in the dissertation or told to anybody and that was for ethical considerations.

3.8 Role of the Researcher

The role of the researcher was significant in this dissertation. Knowing the students' backgrounds and academic abilities was very important and inspiring through the whole study as the students responded and cooperated very well. I was a coach for the whole process starting from explaining the purpose of the research to the students and the administration to distributing the tests and collecting them. I also enjoyed teaching the course about environmental issues, and I felt that this course added a lot to their knowledge and to the way they will interact later with their surroundings and environment. The experience of this study gave me a lot of confidence in the field of research and it was an eye opener for me to conduct more research in the future on different environmental issues. Although the sample population consisted of my own students but I remained neutral all the time and I kept an open mind about the results of the whole study.

3.9 Procedures & Data Collection

The researcher designed a pre-test and a post-test to assess the students' knowledge before and after the EE given course. The first step to implement the study was to explain the process and the purpose for both the parents and the students and get their approval in a written format. Next the students were given the pre-test in the classroom and they were asked to answer the questions they knew. The students and the parents were assured from the very beginning that this work will not be graded and will not affect the students' marks or the teacher's attitude towards them. All what was required is to answer the test and cover all the questions as much as they can. The researcher further explained that the students should not write their names on the test paper as their identity will remain anonymous. The researcher collected the pre-test and analyzed its data using Microsoft Excel; first the data was collected from the sample and then the data were entered

manually to the Excel program. The Excel programs helped creating statistics and percentage for each item entered. Eventually the researcher was able to organize the data and describe them. After everything was clearly described and illustrated the researcher was able to extract the results.

The students then were given an intervention of two weeks course about overall environmental knowledge and awareness in the UAE. Lesson plans were focused primarily and linked to the test given (from water pollution to air pollution and farming and energy consumption). At the end of the intervention the students were given a project to do to spread awareness about the environment issues in the UAE and the post test was given afterwards. At the end of the process the students were asked to answer survey questions to get the overall feedback and the researcher analyzed the rest of the data.

3.10 Study Limitations

The study had some limitations; those limitations are summarized in the fact that there was no field work and no access to outside nature due to time and school restrictions. The intervention was supposed to spread over a longer period but due to changes in the calendar of the school year it was cut short. Moreover, the sample population was relatively small. In addition, there were no similar studies done in UAE to cover the same topic. In general, the experience of this course was very fruitful and very encouraging, and the students mentioned that they had fun time exploring about environment issues. They also revealed that next time they would prefer to practice using their own hands in an outdoor setting. They wanted to see things that occur in front of them instead of just writing about them. On the other hand, the students came from a certain level in society, since it is a private school so their parents' financial abilities are good. This represents another limitation because the researcher doesn't know what kind of behavior the students will adopt if they come from a poor or a different class in society.

In general, the overall course and experience was very satisfying for both the students and the researcher as the students' response was amazing. This proved that students want to interact with their environment and know more about it to be able to protect it and have a sustainable future.

Chapter 4: Results and Discussion

This chapter is dedicated to shed light on the meaning and the explanation of the data extracted. The pre-test, the post-test and survey were carried out to show the results and impact of the before and after process of educating the students about environment in an example of EE. There is a demonstration for the students' responses, how they choose the answers the scaling of all of this in the whole process. Each and every research question will be mentioned in a separate section, and then the results will be demonstrated based on the relevant answers from the pre-test, post-test and survey. The total amount of the students is 174 students, aged 11 to 13 years old, of which are 92 males and 82 females.

4.1 The Pre-Test

4.1.1 Knowledge Section

The following chart and table show the results of the first section of the pre-test:

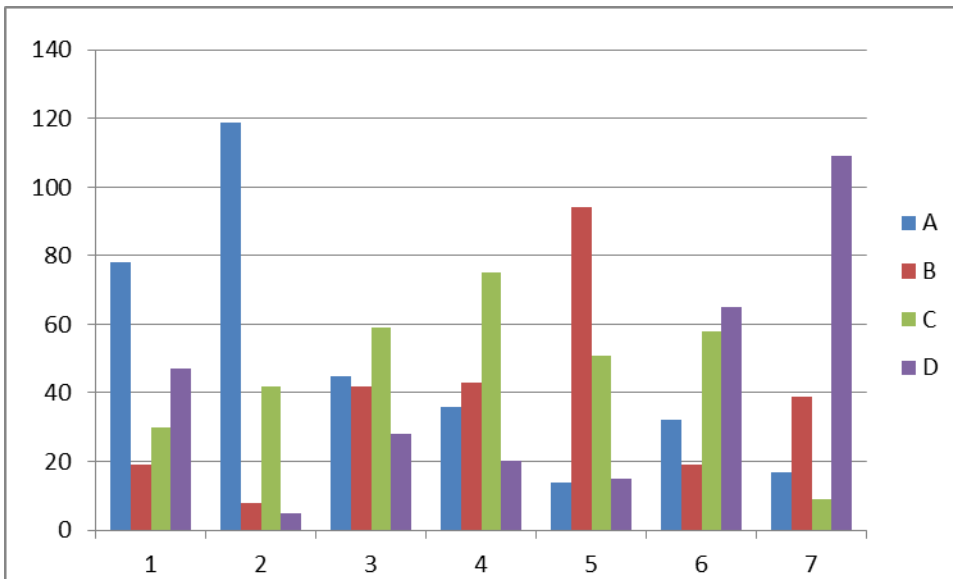


Figure 2: The results of part one in the pre-test

Question Number	A		B		C		D	
1	78	44.8%	19	10.9%	30	17.2%	47	27.1%
2	119	68.4%	8	4.6%	42	24.1%	5	2.9%
3	45	25.9%	42	24.1%	59	33.9%	28	16.1%
4	36	20.7%	43	24.7%	75	43.1%	20	11.5%
5	14	8%	94	54%	51	29.3%	15	8.7%
6	32	18.4%	19	10.9%	58	33.3%	65	37.4%
7	17	9.8%	39	22.4%	9	5.2%	109	62.6%

Table 1: The results extracted from part one in the Pre-test.

For the question number (1), approximately, how many trees are cut down each day? - the highest number of students chose answer number (A): One hundred thousand which gained 44.8% of the choices, the second choice was (D) : Two Million- and gained 27.1% then in the third place was choice number (C) Four Million - and gained 24.1% and the least choice among students was (B) Ten Billion- which gained 10.9%. Question (2) Carbon monoxide is a major contributor to air pollution around the world. Which of these is the biggest source of carbon monoxide? –the highest number of students chose answer number (A) – Factories – with a whopping 68.4% and in the second place option (c) – came: Moto vehicles – with 24.1%, third place was option (B) – People Breathing – that reached only 4.6% and at last option (D) – Trees – got only 2.9% of the students opinions. The results for question (3) - How is most electricity generated? – were so close, Option (c) - Solar Energy –came as the highest answer 33.9% while option (a) - By burning oil, coal and wood – came in second place gaining 25.9% and in third place was option (b) - Nuclear power – resulting 24.1% and at last option (d) - Hydro-electric power plants – with only 16.1%. Question (4) - Which of the following is renewable? – had the highest answer as option number (C) – Trees– winning 43.1% of votes and in second place came option (b) – Iron Ore – with 24.7% while in third place came option (A) – Oil- with 20.7% and at last place was option (d) – Coal- winning 11.5% of total votes. Question (5) - which is the most common reason that causes animal extinction? – had the highest option as option (b) - Habitats being destroyed by humans – with 54%

result, second place goes to option (c) – Too much hunting- with 29.3% while third place goes to option(d) – Climate change- with 8.7% and at last option (a) – Pesticides – with only 8%. Question (6) which of the following is the most common cause of water pollution? – almost had a very fine competition in first places and last places, highest option won only 37.4% and second one was 33.3% for options (d) – Oil spills – and (c) – wastes from factories – and in the third place came option (a) – Garbage dumped by cities – with only 18.4% and last place was for option (b) - Water running off city streets and farm fields- taking only 10.9%. Question (7) - what does the ozone layer protect us from? - had option (d) - Cancer- causing sunlight- as highest ranked one with 62.6%, option (b) – Global warming - came in the second place with 22.4% and third place goes to option (a) – Acid Rain - which comes with 9.8% and at last option (c) Sudden changes in temperature- which came with 5.2% only.

4.1.2 Environmental awareness in UAE

The second part of the section answers are illustrated in the following table and chart:

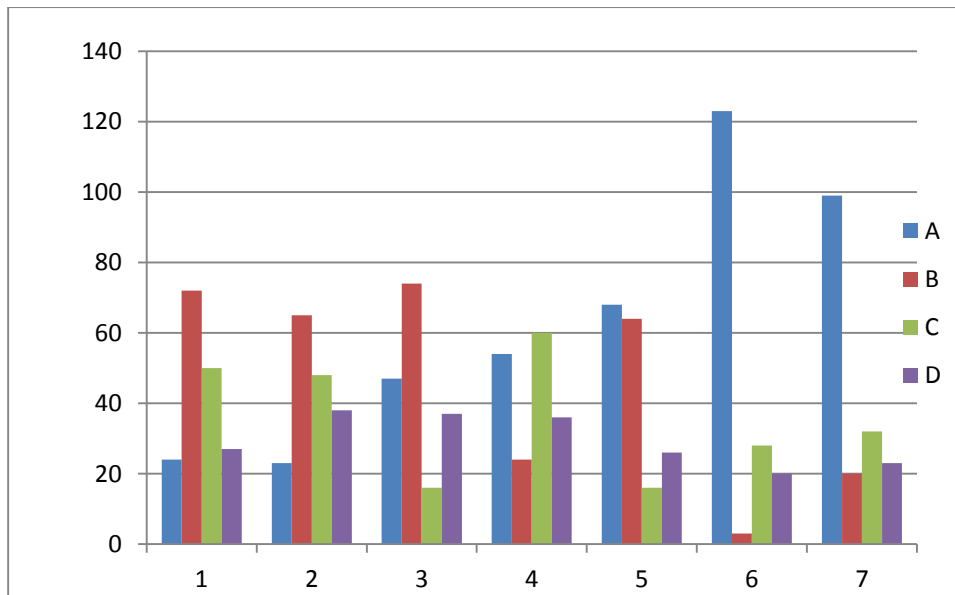


Figure 3: The results of part two in the pre-test

Question Number	A		B		C		D	
1	24	13.8%	72	41.4%	50	28.7%	27	15.5%
2	23	13.2%	65	37.4%	48	27.6%	38	21.8%
3	47	27%	74	42.5%	16	9.2%	37	21.3%
4	54	31%	24	13.8%	60	34.5%	36	20.7%
5	68	39.1%	64	36.8%	16	9.2%	26	14.9%
6	123	70.7%	3	1.7%	28	16%	20	11.5%
7	99	56.9%	20	11.5%	32	18.4%	23	13.2%

Table 2: The results extracted from part two in the Pre-test.

Question (1) - After using your video games/I pads/ laptops, and not intending to use them for the rest of the day, What do you usually do? – the highest number of students chose option (b) - Switch them off but keep them charged all day – rating 41.4% while option (c) - Switch them off without being charged – scored 28.7% then option (d) - Keep them on all times (never switch them off) – came third rating 15.5% and at last place came option (a) - Keep them on but on standby – scored 13.8%. Question (2) – While brushing your teeth, you usually: - scored highest result with option (b) – close the tap water until you need it – rating 37.4% then option (c) – Don’t really remember – scored 27.6% in second place while third place goes to option (d) – I don’t remember or notice – which scored 21.8% and at last option (a) scoring only 13.2%. Question (3) – After leaving a room, what do you usually do? – scored highest choice as option (b) – Switch off lights and AC – rating 42.5% then option (a) – Switch off the lights but I keep the AC on – rating 27% secondly, third place goes to option (d) – I don’t remember or notice – rating 21.3% of the choices and at last option (c) – Leave both on – rating 9.2%. Question (4): If you see someone damaging the environment (littering for example). What do you do? – gained highest results with option (c) – It’s not my problem – rating 34.5% then option (a) - don’t approach them or talk to them because I don’t care – rated at 31% in second place, third place goes to option (d) - I would fix the problem after they are gone – rating 20.7% and at last option (b) – I don’t approach them or talk to them because I feel shy – scoring only 13.8% of the choices. Question (5) - On social media (Facebook

for example), when you come across an alarming article about an environmental problem, what do you do? – had a competition in answers that option (a) - Get really interested and open the article to find out more – scoring 39.1% came first then second was option (b) - Just scroll down and continue reading other things – rating only 36.8%, third place goes to option (d) - I don't really get environmental posts on my Facebook profile – rated 14.9% of the total choices and at last came option (c) - Only read people's comments – rating 9.2% only. Questions (6) - In school, new recycling bins are set up for recycling plastics and paper. What do you think of this step? – Had a very clear winner since option (a) - It is very encouraging and I love it! - scored 70.7% while Option (c) – I don't really care - scored 16% and third place was for option (d) – I love recycling and always do - rating 11.5% and last place goes to option (b) – It is just a waste of time - scoring only 1.7% of the total votes. Question (7) - The school decides to have an environmental club. Would you.... – had option (a) - Join without telling anyone – rating 56.9% at first place, second place goes to option (c) - Not join because it is just pointless – scoring 18.4% while third place goes to option (d) - Not join, because I don't care about the environment. – Hitting only 13.2% and last place in the list goes to option (b) - Join and try to encourage your friends – scoring 11.5%.

4.1.3 Environmental Behavior.

This section is dedicated to the last section in the pre-test:

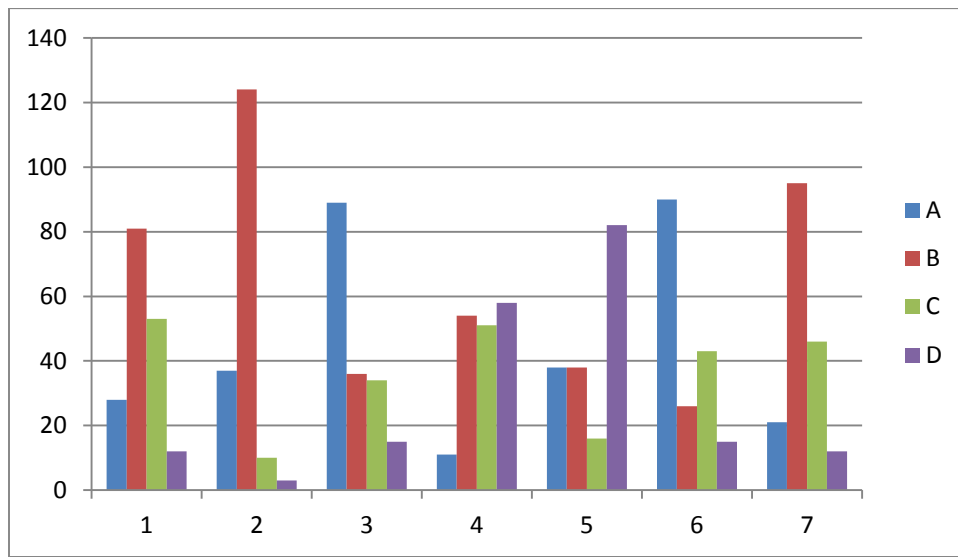


Figure 4: The results of part three in the pre-test

Question Number	A		B		C		D	
1	28	16.1%	81	46.6%	53	30.5%	12	6.9%
2	37	21.3%	124	71.3%	10	5.7%	3	1.7%
3	89	51.2%	36	20.7%	34	19.5%	15	8.6%
4	11	6.3%	54	31%	51	29.3%	58	33.4%
5	38	21.8%	38	21.8%	16	9.2%	82	47.2%
6	90	51.7%	26	14.9%	43	24.7%	15	8.6%
7	21	12.1%	95	54.6%	46	26.4%	12	6.9%

Table 3: The results extracted from part three in the Pre-test.

Question (1) - Where does our garbage end up? –option (b) – Recycling Centers – as the highest answer rating 46.6% and in second place came option (c) – Landfills – which was rated 30.5% while third place was taken by option (a) – Ocean hitting 16.1% only of the answers and the least chosen option was option (d) – Burnt somewhere. Question (2) - Approximately, how much electricity is consumed per person in the UAE? – had the highest answer to be option (b) – 21,000Kwh per person – with a whooping rate of 71.3% and in second place came option (A) -300 Kwh per person – rating only 21.3% while option (c) – 13,000 Kwh per person – rated only 5.7% and last place goes to option (d) 7,000 Kwh per person – scored only 1.7% of total choices. Question (3) - 70% of the water in the UAE is used for what purpose? – got the highest ranked answer to be option (a) – Cleaning and washing – rating 51.2% then option (b) – Personal use in homes – scored 20.7% in second place, third place goes to option (c) – Fountains – and it got 19.5% while last option was option (d) – Agriculture and irrigation – scored only 8.6%. Question (4) - What is the name of the agency that cares for the environment in Abu Dhabi? – Scored option (d) - The Environmental Agency (EAD) – as the highest option with 33.4% while option (b) - b)National Environment Agency (NEA) – got second place scoring 31%, third place goes to option (c) - Department of Health, Environment and Safety (DHES) – scoring 29.3% and last place goes to option (a) - Environmental Protection Agency (EPA) - scoring 6.3%. Question (5) - What is the UAE’s biggest environmental issue? - had an obvious winning option, option (d) – Garbage Disposal –

hitting 47.2% while second place was a tie between options (a) and (b) – Air Pollution and Energy consumption per person – each rating 21.8% and last place goes to option (c) – Water Pollution – gaining 9.2% only. Questions (6) – Does UAE have recycling centers? – ranked highest answer as option (a) – Yes of course – scoring 51.7% then option (c) – Maybe, I don’t know – came second place rating 24.7% and third place goes to option (b) – of course not - which scored 14.9% and at last came option (d) – I guess – rating only 8.6% only of the total samples. Question (7) - Do you think UAE do enough to protect the environment? – Had the highest option as option (b) – No! – Scoring 54.6% while second place was for option (c) – Maybe, I don’t know – scoring 26.4% and third place was for option (a) – Yes! – Rating 12.1% and in last place came option (d) – I don’t really care – rating 6.9%.

4.2 Post Test

4.2.1 Knowledge Section

The following section is dedicated to section one in the post-test:

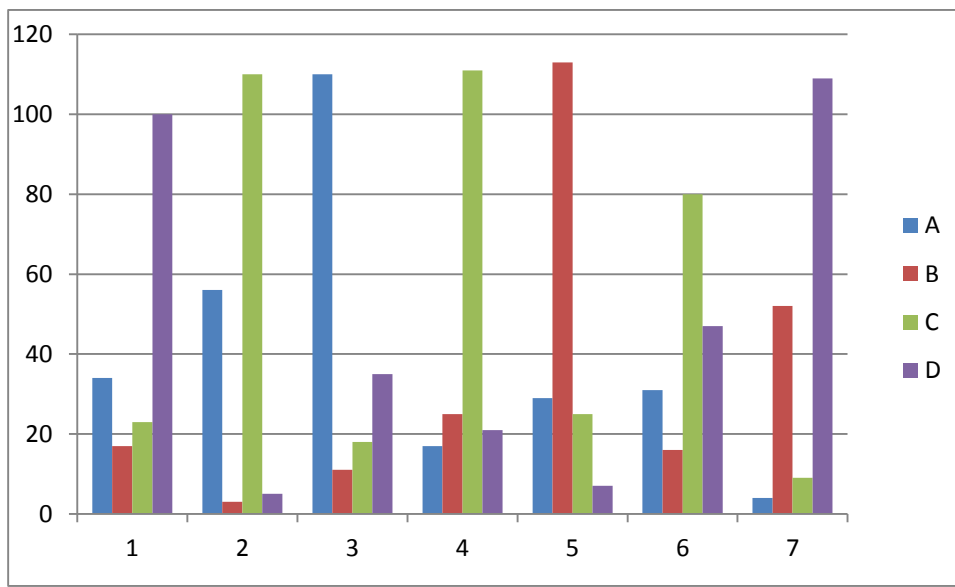


Figure 5: The results of part one in the post-test

Question Number	A		B		C		D	
1	34	19.5%	17	9.8	23	13.2%	100	57.5%
2	56	32.2%	3	1.7%	110	63.2%	5	2.9%
3	110	63.2%	11	6.3%	18	10.3%	35	20.1%
4	17	9.8%	25	14.4%	111	63.8%	21	12.1%
5	29	16.7%	113	64.9%	25	14.4%	7	2.3%
6	31	17.8%	16	9.2%	80	46%	47	27%
7	4	2.3%	52	29.9%	9	5.2%	109	62.4%

Table 4: The results extracted from part one in the post-test.

Question (1) - Approximately, how many trees are cut down each day? – had option (d) – Two Million – as the highest result rating at 57.5% then option (a) – One hundred thousand – rating 19.5% at second place, third place goes to option (c) – Four Million – rating 13.2% while last option was option (b) – Ten Billion – rated only 9.8%. Question (2) - Carbon monoxide is a major contributor to air pollution around the world. Which of these is the biggest source of carbon monoxide? – had option (c) – Motor Vehicles – as the highest choice rating 63.2% then came in second place option (a) – Factories – rating 32.2% then third place goes to option (d) – Trees – gaining only 2.9% and at last option (b) – People breathing – hitting 1.7% only at last place of the choices. Question (3) - How is most electricity generated? – got the highest option as option (a) – By burning oil. Coal and wood – rating 63.2% then second place goes to option (d) – Hydro-electric power plants – rating 20.1% while third place goes to option (c) – Solar Energy – rating only 10.3% and last place was taken by option (b) – Nuclear Power – rating only 6.3%. Question (4) - Which of the following is renewable? – had highest score with option (c) – Trees – rating 63.8% then second place goes to option (b) – Iron Ore – hitting 14.4% then third place goes to option (d) – Coal – rating 12.1% while last place goes to option (a) – Oil – scoring 9.8%. Question (5) - Which is the most common reason that causes animal extinction? – got the highest option as option (b) :Habitats being destroyed by humans – hitting hard at 64.9%, second place goes to option (a) – Pesticides – rating 16.7% while third place goes to option (c) – Too much hunting – rating 14.4% and at last

option (d) – Climate change – rating 2.3%. Question (6) - Which of the following is the most common cause of water pollution? – had highest option as option (c) – Wastes from factories – rating 46% then option (d) – Oil spills – being second with a result of 27% and third place goes to option (a) - Garbage dumped by cities – being 17.8% while last place goes to option (b) - Water running off city streets and farm fields – scoring 9.2%. Question (7) - What does the ozone layer protect us from? – hit highest option as option (d) - Cancer- causing sunlight – with a score of 62.4% while second place goes to option (b) – Global Warming – hitting 29.9% and third place goes to option (c) - Sudden changes in temperature – scoring 5.2% and at last place comes option (a) – Acid Rain – scoring 2.3% only.

4.2.2 Environmental Awareness in UAE

This section is about part two in the post test:

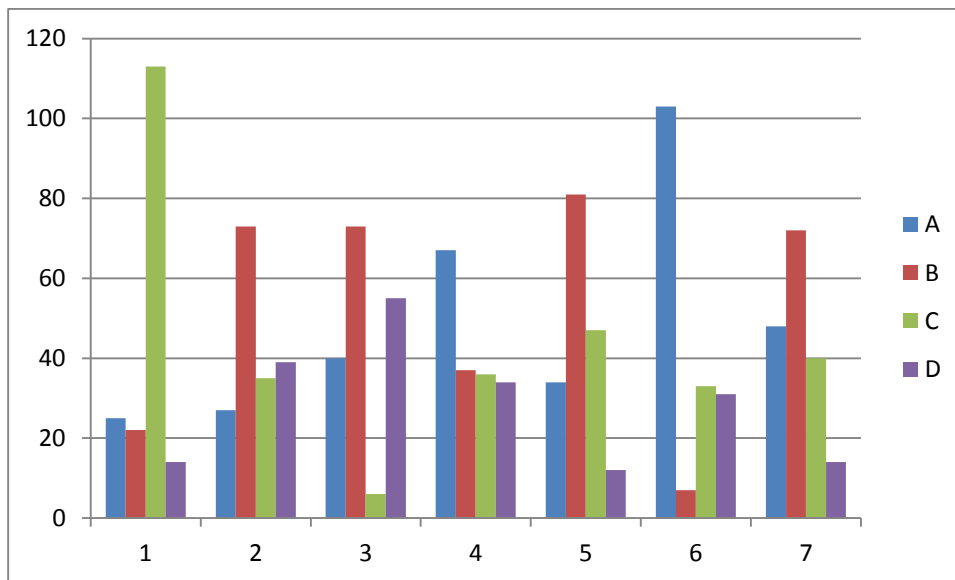


Figure 6: The results of part two in the post-test

Question Number	A		B		C		D	
1	25	14.4%	22	12.6%	113	64.9%	14	8.1%
2	27	15.5%	73	42%	35	20.1%	39	22.4%
3	40	23%	73	42%	6	3.4%	55	31.6%
4	67	38.5%	37	21.3%	36	20.7%	34	19.5%
5	34	19.5%	81	46.6%	47	27%	12	6.9%
6	103	59.2%	7	4%	33	19%	31	17.8%
7	48	27.6%	72	41.4%	40	23%	14	8%

Table 5: The results extracted from part two in the post-test.

Question (1) – Where does our garbage end up? – had option (c) – Landfills – as the highest answer rating 64.9% while option (a) – Ocean – got the second highest answer rating 14.4%, third place comes with option (b) – Recycling Centers – hitting 12.6% and last place goes to option (d) – Burnt Somewhere – scoring only 8.1%. Question (2) - Approximately, how much electricity is consumed per person in the UAE? – had its first place answer as option (b) - 21,000 Kwh per person – rating 42% of the total choices made by the students, second place goes to option (d) - 7,000 Kwh per person – hitting 22.4%, then third place goes to option (c) - 13,000 Kwh per person – scoring only 20.1% which was so close to option (d), last place goes to option (a) - 300 Kwh per person – roughly reaching 15.5%. Question (3) - 70% of the water in the UAE is used for what purpose? – had its first highest option as option (b) – Personal use in homes – rating 42% while the second option goes to option (d) – Agriculture and irrigation – scoring 31.6% and then option (a) – Cleaning and washing – scored 23% only leaving option (c) – Fountains – as the last option scoring 3.4% only. Question (4) - What is the name of the agency that cares for the environment in Abu Dhabi? – had a winning choice as option (a) -Environmental Protection Agency (EPA) – scored 38.5% while option (B) - National Environment Agency (NEA) – ranking 21.3% and third place goes to option (c) - Department of Health, Environment and Safety (DHES) – 20.7% only was scored and that led option (d) - The Environmental Agency (EAD) – to be in last place scoring only

19.5%. Question (5) - What is the UAE's biggest environmental issue? – got the highest answer as option (b) – Energy consumption per person – rating 46.6% and that left option (c) – Water pollution – hitting 27% which led option (a) – Air Pollution – 19.5% to be on the third place, and that leaves option (d) – Garbage disposal – rating 6.9% only. Questions (6) – Does UAE have recycling centers? – Had its highest answer as option (a) – Yes, of course. – scoring 59.2%, option (c) – Maybe, I don't know – rated 19% only making it in second place, third place goes to option (d) – I guess – rating 17.8% and finally last place goes to option (b) – Of course not! – 4% only. Question (7) - Do you think UAE does enough to protect the environment? – Showed that option (b) – No! – scored 41.4% making it the highest choice, while option (a) – Yes! – scored 27.6% making it comes in second place, third place goes to option (c) – Maybe, I don't know – scoring 23% and last place goes to option (d) – I don't really care – scored 8% only.

4.2.3 Environmental Behavior

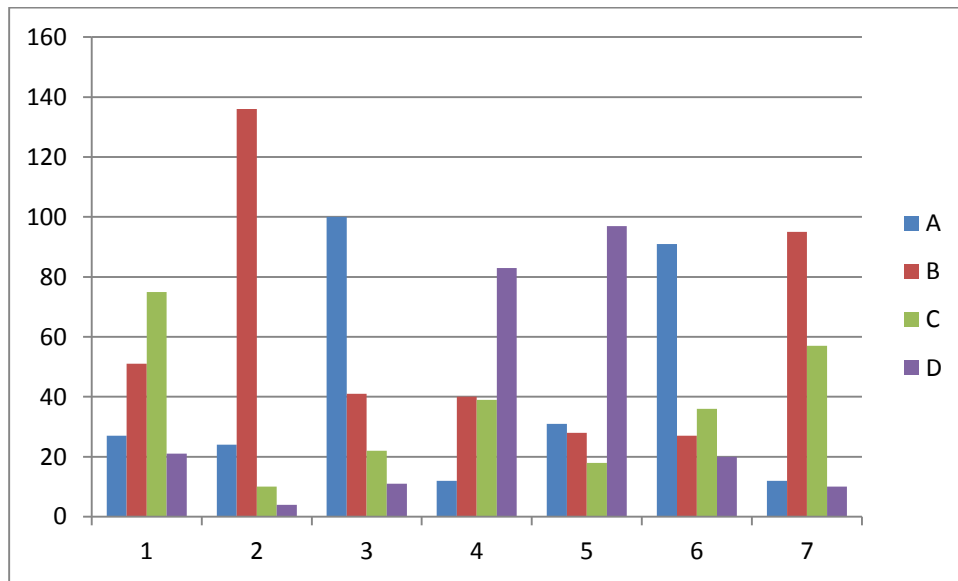


Figure 7: The results of part three in the post-test

Question Number	A		B		C		D	
1	27	15.5%	51	29.3%	75	43.1%	21	12.1%
2	24	13.8%	136	78.2%	10	5.7%	4	2.3%
3	100	57.5%	41	23.6%	22	12.6%	11	6.3%
4	12	6.9%	40	23%	39	22.4%	83	47.7%
5	31	17.8%	28	16.1%	18	10.3%	97	55.7%
6	91	52.3%	27	15.5%	36	20.7%	20	11.5%
7	12	6.9%	95	54.6%	57	32.8%	10	5.7%

Table 6: The results extracted from part three in the post-test.

Question (1) - After using your video games/I pads/ laptops, and not intend to use them for the rest of the day. What do you usually do? - 8) After using your video games/I pads/ laptops, and don't intend on using them for the rest of the day. What do you usually do? – had the highest answer to be option (c) – Switch them off without being charged – hitting 43.1% which led option (b) – Switch them off but keep them charged all day – to score 29.3% and third place went to option (a) - Keep them on but on standby – 15.5% and came in final place option (d) – Keep them on all times (never switch them off) rating only 12.1%. Question (2) - While brushing your teeth, you usually: - had the highest option and option (b) - Close the tap water until you need it – rating 78.2% and in second place comes option (a) - Keep the tap water running – scoring 13.8%, third place goes to option (c) - Don't really remember – rating 5.7% and last place goes to option (d) – I don't brush my teeth – hitting 2.3% only of the total votes. Question (3) - After leaving a room, what do you usually do? – Attained the highest answer to be option (a) - Switch off the lights but I keep the AC on – rating 57.5% while option (b) - Switch off lights and AC – got second place scoring 23.6%, third place goes to option (c) – Leave both on – rating 12.6% and last place goes to option (d) – I don't remember or notice – scoring only 6.3%. Question (4) - If you see someone damaging the environment (littering for example),

What do you do? – had option (d) - I would fix the problem after they are gone – as the first highest option rating 47.7%, second option was option (b) - I don't approach them or talk to them because I feel shy – hitting only 23% while third place goes by a narrow split to option (c) - It's not my problem – only rating 22.4%, last place goes to option (a) - I don't approach them or talk to them because I don't care – only scoring 6.9%. Question (5) - On social media (Facebook for example), when you come across an alarming article about an environmental problem, what do you do? – had option (d) - h), I don't really get environmental posts on my Facebook profile – as the first highest option rating 55.7% while second place goes to option (a) - Get really interested and open the article to find out more – rating 17.8% leaving option (b) - Just scroll down and continue reading other things – with only a rate of 16.1% which puts the result of 10.3% of option (c) - Only read people's comments – in last place. Questions (6) - In school, new recycling bins are set up for recycling plastics and paper. What do you think of this step? Option (a) - It is very encouraging and I love it! – as the highest option resulting 52.3% of the total choices of the students which makes option (c) -I don't really care – in second place resulting 20.7% and that led to have option (b) - It is just a waste of time – in third place with 15.5%, at last comes option (d) - I love recycling and always do! – With 11.5% only. Question (7) - The school decides to have an environmental club. Would you.... – got its highest option as option (b) - Join and try to encourage your friends – scoring 54.6%, second place goes to option (c) - Not join because it is just pointless – rating 32.8% while that left option (a) -Join without telling anyone – being rated 6.9% to come in third place and last place goes to option (d) - Not join, because I don't care about the environment. – being only 5.7%.

4.3 Post Survey

4.3.1 Section One

The following results are extracted from the post survey:

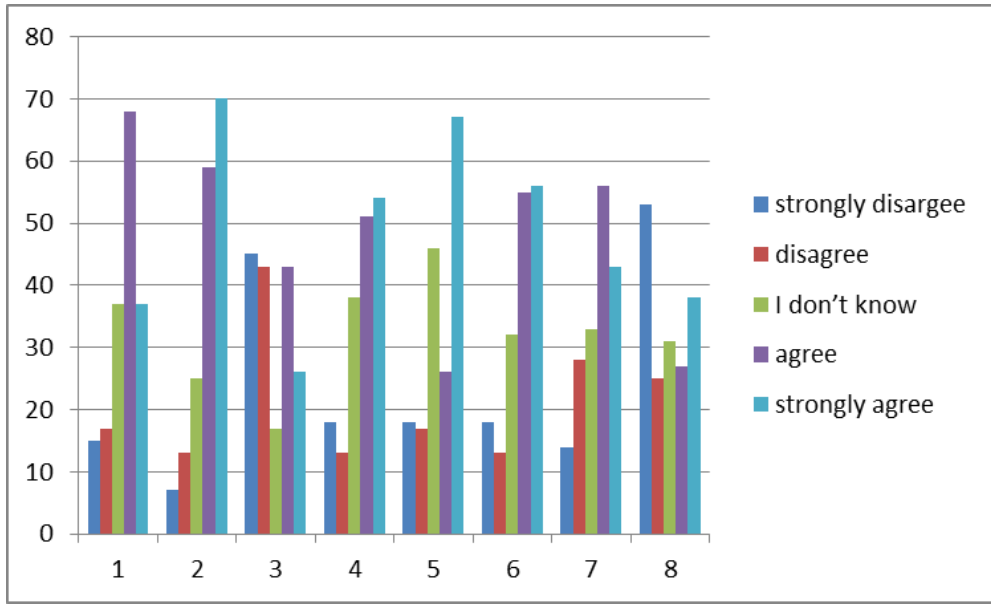


Figure 8: The results of the Post-Survey

Statement	1 Strongly disagree		2 Disagree		3 I don't know		4 Agree		5 Strongly agree	
	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage
I was looking forward to discuss environmental issues in class this year.	15	8.6%	17	9.8%	37	21.3%	68	39.1%	37	21.3%
I was pleased with the way it was introduced and taught in class.	7	4%	13	7.5%	25	14.4%	59	33.9%	70	40.2%
After each day, I went home and discussed issues with my family and friends.	45	25.9%	43	24.7%	17	9.8%	43	24.7%	26	14.9%
After the course, I have changed many misconceptions I had about environmental issues in UAE.	18	10.3%	13	7.5%	38	21.8%	51	29.3%	54	31%
I have changed my attitude and behavior towards my environment.	18	10.3%	17	9.8%	46	26.4%	26	14.9%	67	38.5%
I really want to learn and know more ways of how I can save the environment.	18	10.3%	13	7.5%	32	18.4%	55	31.6%	56	32.1%

I want to be more involved with my environment.	14	8%	28	16.1%	33	19%	56	32.1%	43	24.7%
I want it to be taught as a subject in school.	53	30.5%	25	14.4%	31	17.8%	27	15.5%	38	21.8%

Table 7: The results of the Post-survey

About looking forward to discuss environmental issues in class, 39.1% agreed that they wanted to do so, 21.3% agreed and the same number didn't know about it, 9.8% disagreed and 8.6% strongly disagreed. The way the materials about EE was introduced and taught in class in a good pleasant way got a 40.2% of students strongly agreeing about that, 33.9% agreed, 14.4% don't know, 7.5% disagree and at last 4% strongly disagree that it was a pleasant experience. After each day, I went home and discussed issues with my family and friends. For such an action 25.9% strongly disagreed, 24.7% agreed and disagreed, 14.9% strongly agreed and 9.8% don't know. After the course, I have changed many misconceptions I had about environmental issues in UAE. That statement got a strong agree by 31%, agree by 29.3%, people who don't know yet by 21.8%, 10.3% strongly disagreed and 7.5% disagreed. Changing the attitude and behavior towards the environment was strongly agreed by 38.5%, the "I don't know" option gained 26.4%, 14.9% agreed, 10.3% strongly disagreed, and 9.8% disagreed. When it came to learn and know more ways of how to save the environment 32.1% and 31.6% strongly agreed and agreed positively while 10.3% strongly disagreed, 18.4% don't know and 7.5% agreed. Being involved more and more with the environment got agreed at with 32.1%, strongly agreed at 24.7%, 19% said that they don't know, 16.1% disagreed and 8% strongly disagreed. Finally when students were asked if they want to be taught EE as a subject in school, 30.5% of them strongly disagreed, 21.8% strongly agreed, 17.8 said that they don't know, 15.5% agreed while 14.4% disagreed.

4.3.2 The Second Section

The answer of last question in the survey varied, in general out of the total sample of 174 students, 67 students answered yes and the other 107 students answered no. In the following there is a sample of some students' answers. Sample answers of students who answered yes:

Student 1: “Yes, I wanted to do activities that encourage us more.”

Student 2: “Yes, I would rather learn more about it with a field trip or see the pollution and discuss it together with my teacher and classmates.”

Student 3: “go on a field trip”

Student 4: “yes, we can go educational trips to recycling centers and places where energy is made. Then if we see the hard work we would change our mind”.

Student 5: “yes, I would have rather had a recycling day in school and would like to have a trip to places with issues.”

Student 6: “yes, I would like to have trips to help the environment (physical work)”.

Student 7: “I suggest that schools should teach more about the environment so students could know more.”

Student 8: “we can teach students more so that they can keep our planet safe, so our new generation can live a good life like we lived.”

Student 9: “yes, I would suggest an environmental day.”

Student 10: “yes, maybe the school can prepare for the students an environmental day.”

Student 11: “yes, if we had the chance to go to the beach and help clean it”.

Student 12: “yes, maybe have a day to help clean the U.A.E”

4.4 All the Findings

The main findings of this study state that EE is an important element in the process of increasing awareness and in changing the attitudes of middle school students towards the environment. The empirical research through the pre-test and post-test show that the students behaviors, attitudes and awareness have increased significantly after the two weeks intervention course given to them by the researcher. On the other side, the post-survey reflected that the participating students enjoyed the experience of the course and benefited from it a lot. It was also noted that the students were keen on learning by doing

and they mentioned in most of their answers that they prefer to explore the practical side of their course and interact with the environment more and more to apply what they have learnt. In general the whole experience of the study was fruitful and interesting. In addition, the researcher invites educators and policy makers in the light of the current study to focus on EE and integrate it into school curricula in the different stages. Based on the current study, there was a significant change in the behavior and the attitudes of the participating students in this study towards the environment. Therefore, this type of education is found to be essential to maintain a sustainable environment for future generations.

4.5 Discussion

The main purpose of this dissertation is to examine students' attitudes, behavior and knowledge before an EE course. Based on the results extracted from the pre-test, the post-test and the survey, it is clear that the students' knowledge increased after the EE course and that they like the experience of the course. At the beginning of the whole study, the students showed lack of knowledge about environmental behavior and they were not very much aware of the damage caused to the environment around them through their own behavior. One student mentioned that we are tiny in this world and our impact on the environment is not worth mentioning. With this perspective, the students were not able to realize that each individual on earth had an impact on the environment and that through responsible environment behaviors he/she can add more damage or can save the environment. The students after the study are convinced that even we are small in this universe but our actions and deeds matter. It is true that no one can affect the whole world and make significant changes, but at least through our behavior we can minimize the damage caused to the environment and save earth to the next generations. At the same time, many benefits are gained for us through having a sustainable environment. The most important part in this study was the desire of the students to work on their own hands and explore more topics in regards to environmental education (EE). The post-test shed light upon the amount of information the students acquired through the intervention course, and this led them to develop responsible environment behavior. As they are now more knowledgeable about the topic, they can make informed decisions in their daily life

and thus they will contribute to saving the environment. These findings agree with the previous research and the theoretical framework, Hines et al. (1986/87) revealed that being informed about the topic and having the knowledge of citizenship are said to be the most important factors in driving people to act. It is also true that Hines et al. (1987) also found other factors such as social, economic aspects and those factors also influence people's ability to act either positively or negatively and having the students coming from a private school in this study means that they have a certain high standard of living and that financially they are better than others. According to Hines et al. (1978), the students acted towards the environment in a better way because they were more knowledgeable and informed, that's why they acquired responsible environment behavior. Similarly, the model of Hungerford and Volk's (1990) states that there are variables that affect individuals' responsible environmental behaviors. The three main categories are; entry level variables, ownership variables and empowerment variables (Hungerford & Volk, 1990). Unfortunately the researcher was not able to examine the various variables in this study because the sample population was rather limited. There is also the theory of Palmer (1998) who introduced the UK model of environmental education in the following: "education about the environment...in educating from (in) the environment...to be education for the environment...", (Palmer, 1998). This actually was reflected upon the students' attitudes after the two weeks intervention course. The students became more educated about the environment and that's why they make informed decisions and they care more than before because they know that their behavior towards the environment matters. In addition, the researcher noticed that adding the practical side to the course maximized its benefits and allowed the students to have solid unforgettable information from what they learn. Needless to say that integrating EE in school curricula is a must after all the environmental issues earth is facing and based on the research conducted in this dissertation, a significant change occurred in the students' knowledge, attitudes and behavior towards the environment after they were more knowledgeable and informed about their own impact on the environment and the benefits they may get for on the long run for themselves and for the future generations through their own responsible environment behavior.

Chapter Five: Conclusion

This chapter will be discussing the final conclusions and findings of the dissertation as well as the scope of the study and its implications.

5.1 Summary

The results of the study are summarized in the fact that environmental education (EE) is essential and important for students to develop responsible environmental behaviour. The researcher also concluded that educators and policy makers should take into consideration the results of this study to integrate EE into school curricula in all stages with varying degrees of content according to each educational stage.

5.2 The Key Findings

The key findings of the current dissertation are summarized in the following:

- The students lacked the knowledge about environmental issues as per the pre-test results and analysis.
- The students demonstrated an increased awareness after the period of the two weeks intervention course.
- It is preferable that EE is integrated into school curricula to raise awareness among middle school students because this awareness will reflect on acquiring responsible environment behaviour and serve to protect the environment.

5.3 Implications of the Study

The results of this study cover the two research questions posed. The researcher found out that the students awareness increased significantly after the intervention course. Moreover, in the post survey, the students reflected that they liked the experience of the course a lot and benefited from it; however, they needed to focus more on the practical side and to explore the outdoor environment to see what they have taught. The EE course was useful for the students as it increased their awareness and knowledge, and it is expected that their attitudes towards the environment will change a lot from now on. This

kind of education is found to be important and essential to the future generations. This agrees with previous research findings such as in the study of (Redman, 2013) who mentioned that it is essential to have this kind of education integrated into school curricula. In addition, a change of behaviour and attitudes in students was also noted in the current study. This finding agrees with what (Guler & Afacan, 2012) and (Erdogan, 2011) concluded in their study, as they mentioned that they also noted a significant change in the students' knowledge and behavior in their own studies. Finally, the post survey reflected that the students are eager to know more about the environment and that they are particularly interested in the practical side; this finding corresponds to what (McCann, 2011) mentioned in his study that the practical side and the on-hands experience leads to better results in this kind of education.

In addition, the researcher came to the conclusion that EE is not only a need to be integrated into school curricula but it is also a must to educate children about the environmental issues and the environment surrounding it. By developing responsible behavior towards the environment, the students now who will be the leaders of our future can protect earth and have a sustainable future. The researcher urges educators and policy makers to integrate this type of education into school curricula because the current study showed significant change in the students' behavior.

5.3 Scope of the Study

The field of EE is actually a very interesting field and I believe that it requires more research in the future. While it is no doubt that EE is essential and important to have a sustainable future, it was also noted that it is very important to choose the topics introduced to the students carefully. As a researcher I would suggest that further research is needed to select certain topics that are both interesting to the students, and informative. It is also important to focus on the practical side of this kind of education because the information will stick to the students' minds and at the same time they will enjoy what they are doing and exploring every day. I also believe that instead of traditional testing the students should be encouraged to projects to gain their marks. This way the knowledge will be based on practical work and the students will get real benefit.

Eventually, through EE, there will be a sustainable future for the coming generation on earth.

5.4 Recommendations

The researcher strongly recommends that educators and policy makers start their plans immediately to integrate the environment education (EE) into school curricula because this will lead to a significant change in the students' behaviors and attitudes and this in turn will leave to more protection for the environment. The result is that Earth will be a sustainable healthy planet for the current and the future generation to live on. The researcher also recommends adding a practical side for this type of curricula, because the study reflected that the students become more interested and enjoy the experience more if they work by their own hands to discover the surroundings and learn about the environment. Many practical examples and case studies should also be given to the students about environmental damage and situations where they are asked to make a decision to protect the environment. This way the students will get the maximum benefit from those courses and thus they will contribute to protecting the environment through developing responsible environmental behavior.

5.5 Concluding Note

In conclusion, the researcher enjoyed the study and enjoyed giving the students the intervention course. The researcher was also delighted to see actual change in the students' behaviors and attitude towards environmental issues afterwards even in the classroom. Having this study done in UAE, in the researcher's opinion paves the way to more studies in the field of environmental education and this will go along with the vision of the country leaders towards having a sustainable future.

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Appendix I

TEST

Age: _____

Nationality: _____

Gender: female or male

This test was written to find out how much you do know about the environment and environmental problems. It is divided into three sections (knowledge, awareness and behaviour).

Section 1: knowledge

This section determines your knowledge about the environment worldwide.

Write down the letter that reflects what you think the answer is in the table below. Don't worry if you can't answer many of these. If you don't know the answer, guess.

1	2	3	4	5	6	7
D	C	A	C	B	B	D

1) Approximately, how many trees are cut down each day?

- a) One hundred thousand
- b) Ten billion
- c) Four million
- d) Two million

- 2) Carbon monoxide is a major contributor to air pollution around the world. Which of these is the biggest source of carbon monoxide?
- a) Factories
 - b) People breathing
 - c) Motor vehicles
 - d) Trees
- 3) How is most electricity generated?
- a) By burning oil, coal and wood
 - b) Nuclear power
 - c) Solar energy
 - d) Hydro-electric power plants
- 4) Which of the following is renewable?
- a) Oil
 - b) Iron ore
 - c) Trees
 - d) Coal
- 5) Which is the most common reason that causes animal extinction?
- a) Pesticides
 - b) Habitats being destroyed by humans
 - c) Too much hunting
 - d) Climate change
- 6) Which of the following is the most common cause of water pollution?
- a) Garbage dumped by cities
 - b) Water running off city streets and farm fields
 - c) Wastes from factories
 - d) Oil spills

7) What does the ozone layer protect us from?

- a) Acid rain
- b) Global warming
- c) Sudden changes in temperature
- d) Cancer- causing sunlight

Section 2: Environmental awareness in the UAE

Again, don't worry if you don't know how what the answer is. Most people wouldn't know!

Write down the letter that reflects what you think the answer is in the table below.

1	2	3	4	5	6	7
C	C	D	D	B	OPINION	OPINION

1) Where does our garbage end up?

- a) Ocean
- b) Recycling centers
- c) Landfills
- d) Burnt somewhere

2) Approximately, how much electricity is consumed per person in the UAE?

- a) 300 Kwh per person
- b) 21, 000 Kwh per person
- c) 13, 000 Kwh per person
- d) 7,000 Kwh per person

- 3) 70% of the water in the UAE is used for what purpose?
- a) Cleaning and washing
 - b) Personal use in homes
 - c) Fountains
 - d) Agriculture and irrigation
- 4) What is the name of the agency that cares for the environment in Abu Dhabi?
- a) Environmental Protection Agency (EPA)
 - b) National Environment Agency (NEA)
 - c) Department of Health, Environment and Safety (DHES)
 - d) The Environmental Agency (EAD)
- 5) What is the UAE's biggest environmental issue?
- a) Air pollution
 - b) Energy consumption per person
 - c) Water pollution
 - d) Garbage disposal
- 6) Does the UAE have recycling centers?
- a) Yes, of course!
 - b) Of course not!
 - c) Maybe, I don't know.
 - d) I guess.
- 7) Do you think the UAE does enough to protect the environment?
- a) YES!
 - b) NO!
 - c) Maybe, I don't know
 - d) I don't really care

Section 3: Environmental behaviour

There is no wrong or right answers here, just be honest and truthful!

Write down the letter that reflects what you think answer the is in the table below.

1	2	3	4	5	6	7

- 1) After using your video games/ipads/ laptops, and don't intend on using them for the rest of the day. What do you usually do?
 - a) Keep them on but on stand by
 - b) Switch them off but keep them charged all day
 - c) Switch them off without being charged
 - d) Keep them on all times (never switch them off)

- 2) While brushing your teeth, you usually :
 - a) Keep the tap water running
 - b) Close the tap water until you need it
 - c) Don't really remember
 - d) I don't brush my teeth

- 3) After leaving a room. What do you usually do?
 - a) Switch off the lights but I keep the AC on
 - b) Switch off lights and AC
 - c) Leave both on
 - d) I don't remember or notice

- 4) If you see someone damaging the environment (littering for example). What do you do?
- a) I don't approach them or talk to them because I don't care
 - b) I don't approach them or talk to them because I feel shy
 - c) It's not my problem
 - d) I would fix the problem after they are gone
- 5) On social media (facebook for example). When you come across an alarming article about an environmental problem. What do you do?
- a) Get really interested and open the article to find out more
 - b) Just scroll down and continue reading other things
 - c) Only read people's comments
 - d) I don't really get environmental posts on my facebook profile
- 6) In school, new recycling bins are set up for recycling plastics and paper. What do you think of this step?
- a) It is very encouraging and I love it!
 - b) It is just a waste of time
 - c) I don't really care
 - d) I love recycling and always do!
- 7) The school decides to have an environmental club. Would you....
- a) Join without telling anyone
 - b) Join and try to encourage your friends
 - c) Not join because it is just pointless
 - d) Not join, because I don't care about the environment.

Finished! Thank you for your participation and honesty!!!

Appendix II

POST- TEST

Name: _____

Age: _____

Nationality: _____

Gender: female or male

This test was written to find out how much you do know about the environment and environmental problems. It is divided into three sections (knowledge, awareness and behaviour).

Section 1: knowledge

This section determines your knowledge about the environment worldwide.

Write down the letter that reflects what you think the answer is in the table below. Don't worry if you can't answer many of these. If you don't know the answer, guess.

1	2	3	4	5	6	7

8) Approximately, how many trees are cut down each day?

- e) One hundred thousand
- f) Ten billion
- g) Four million
- h) Two million

9) Carbon monoxide is a major contributor to air pollution around the world. Which of these is the biggest source of carbon monoxide?

- e) Factories
- f) People breathing
- g) Motor vehicles
- h) Trees

10) How is most electricity generated?

- e) By burning oil, coal and wood
- f) Nuclear power
- g) Solar energy
- h) Hydro-electric power plants

11) Which of the following is renewable?

- e) Oil
- f) Iron ore
- g) Trees
- h) Coal

12) Which is the most common reason that causes animal extinction?

- e) Pesticides
- f) Habitats being destroyed by humans
- g) Too much hunting
- h) Climate change

13) Which of the following is the most common cause of water pollution?

- e) Garbage dumped by cities
- f) Water running off city streets and farm fields
- g) Wastes from factories
- h) Oil spills

14) What does the ozone layer protect us from?

- e) Acid rain
- f) Global warming
- g) Sudden changes in temperature
- h) Cancer- causing sunlight

Section 2: Environmental awareness in the UAE

Again, don't worry if you don't know how what the answer is. Most people wouldn't know!

Write down the letter that reflects what you think the answer is in the table below.

1	2	3	4	5	6	7

8) Where does our garbage end up?

- e) Ocean
- f) Recycling centers
- g) Landfills
- h) Burnt somewhere

9) Approximately, how much electricity is consumed per person in the UAE?

- e) 300 Kwh per person
- f) 21, 000 Kwh per person
- g) 13, 000 Kwh per person
- h) 7,000 Kwh per person

10) 70% of the water in the UAE is used for what purpose?

- e) Cleaning and washing
- f) Personal use in homes
- g) Fountains
- h) Agriculture and irrigation

11) What is the name of the agency that cares for the environment in Abu Dhabi?

- e) Environmental Protection Agency (EPA)
- f) National Environment Agency (NEA)
- g) Department of Health, Environment and Safety (DHES)
- h) The Environmental Agency (EAD)

12) What is the UAE's biggest environmental issue?

- e) Air pollution
- f) Energy consumption per person
- g) Water pollution
- h) Garbage disposal

13) Does the UAE have recycling centers?

- e) Yes, of course!
- f) Of course not!
- g) Maybe, I don't know.
- h) I guess.

14) Do you think the UAE does enough to protect the environment?

- e) YES!
- f) NO!
- g) Maybe, I don't know
- h) I don't really care

Section 3: Environmental behaviour

There is no wrong or right answers here, just be honest and truthful!

Write down the letter that reflects what you think answer the is in the table below.

1	2	3	4	5	6	7

8) After using your video games/ipads/ laptops, and don't intend on using them for the rest of the day. What do you usually do?

- e) Keep them on but on stand by
- f) Switch them off but keep them charged all day
- g) Switch them off without being charged
- h) Keep them on all times (never switch them off)

9) While brushing your teeth, you usually :

- e) Keep the tap water running
- f) Close the tap water until you need it
- g) Don't really remember
- h) I don't brush my teeth

10) After leaving a room. What do you usually do?

- e) Switch off the lights but I keep the AC on
- f) Switch off lights and AC
- g) Leave both on
- h) I don't remember or notice

11) If you see someone damaging the environment (littering for example). What do you do?

- e) I don't approach them or talk to them because I don't care
- f) I don't approach them or talk to them because I feel shy
- g) It's not my problem
- h) I would fix the problem after they are gone

12) On social media (facebook for example). When you come across an alarming article about an environmental problem. What do you do?

- e) Get really interested and open the article to find out more
- f) Just scroll down and continue reading other things
- g) Only read people's comments
- h) I don't really get environmental posts on my facebook profile

13) In school, new recycling bins are set up for recycling plastics and paper. What do you think of this step?

- e) It is very encouraging and I love it!
- f) It is just a waste of time
- g) I don't really care
- h) I love recycling and always do!

14) The school decides to have an environmental club. Would you....

- e) Join without telling anyone
- f) Join and try to encourage your friends
- g) Not join because it is just pointless
- h) Not join, because I don't care about the environment.

Finished! Thank you for your participation and honesty!!!

Appendix III

Post Survey

Answer the following based on the topic “environmental education” that was taught to you the last two weeks by your teacher.

Please be honest. Know that this is completely anonymous (I will not know who answered what, it’s a secret!!!!)

Tick the box which you think is the most appropriate.

Statement	1 Strongly disagree	2 disagree	3 I don't know	4 agree	5 Strongly agree
I was looking forward to discuss environmental issues in class this year.					
I was pleased with the way it was introduced and taught in class.					
After each day, I went home and discussed issues with my family and friends.					
After the course, I have changed many misconceptions I had about environmental issues in the UAE.					
I have changed my attitude and behavior towards my environment.					
I really want to learn and know more ways of how I can save the environment.					
I want to be more involved with my environment.					
I want it to be taught as a subject in school.					

Is there anything you would have rather done, to learn and experience things about the environmental issues in the UAE? If yes, what do you suggest?

Thank you for completing the survey!!!