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AN EXPLORATION OF THE PURPOSE AND PRACTICE  
OF ENVIRONMENTAL EDUCATION

Dissertation submitted in part fulfillment of the  
requirements for the degree of Master of Science  
(Educational Studies)

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## **Abstract**

Although there have been many studies on the purpose of

environmental education and educational practice, the main goal is to list and explain the purpose of environmental education on the basis of distinguishing the ideology of environmental education. The values and educational practices of environmental education have been controversial. Most of them are directly observing the situations of environmental education practice and then discussing them. Few environmental education purposes are viewed from the overall development history of environmental education, and the effectiveness of educational practice is explored in combination with purposes. Therefore, this research explores the formation and change of environmental education purposes from the perspective of historical development, discusses the values behind the purpose, and further explores the factors that influence the effectiveness of environmental education practices. This research through a systematic literature review found that the purpose of environmental education is constantly evolving following the development of society and the optimization of human values, including the development of knowledge, attitudes, skills, awareness, participation and sustainability. In the practice of environmental education, emotional bond, intergenerational influences, knowledge, attitudes, activities and communication will continue to influence the effectiveness of education in the long term.

**Key Words: Environmental education, Educational Purpose, Educational practice, Effectiveness**

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## 1. INTRODUCTION

Environmental education is generally considered to be traced back to the 18<sup>th</sup> century, the philosopher Jean-Jacques Rousseau proposed it in his literary works (Carter & Simmons, 2010)). Followed by the rise and development of many western philosophies (such as naturalism, transcendentalism, and environmentalism etc.), environmental education has gradually developed into a particular philosophical trend of thought, or education movement (Carter & Simmons, 2010). In 1948, environmental education was officially presented at an international meeting (Carter & Simmons, 2010; Disinger, 1985). At the end of the 19<sup>th</sup> century, environmental education became a kind of natural study science advocated by combining with philosophical thoughts and environmental movements (such as natural study movement) (McCrea, 2006). In the early 20<sup>th</sup> century, conservation education was proposed in order to deal with natural disasters such as sandstorms and began to receive political attentions and support (McCrea, 2006). Following the Second World War, industrial development and environmental pollution were concerned by a series of American writers and politicians. After various regulations on environmental protection were implemented, environmental education officially entered the view of the American public. With the rise of industries in various countries, environmental education began to step into the world stage in the middle and late 20<sup>th</sup> century. The three important declarations issued by the United Nations in 1972, 1975 and 1977 respectively marked a new understanding and high attention of environmental education in the international community (Anderson & Arsenault, 1998;Carter & Simmons, 2010; McCrea, 2006).

For centuries, there have been philosophers and educators who

have emphasized the importance of establishing a close and harmonious relationship with the natural environment. Furthermore, researchers gradually realized that environmental education is an interdisciplinary field, integrating various disciplines such as: biology, chemistry, physics, ecology, earth science, geography, psychology, philosophy, mathematics, atmospheric science etc. (Davis, 2009; Hungerford & Volk, 1990). These educators have continuously attempted to develop new perspectives and new forms of education in combination with themes of environment. Therefore, multiple educational fields have been developed. Among them, there are three forms of education closely related to environmental education that deserve attention. The first is that Citizen Science (CS) aims to involve the public in related projects in scientific research such as data collection through relatively simple instruction (Bonney *et al.*, 2009). The second is Experiential Education (ExE), which is based on past knowledge and experience. It was designed to allow students to directly experience (or apply) the theoretical and academic content that they have learned (Itin, 1999). By using for reference on the concepts of Experiential Education and Environmental Education as references, Outdoor Education (OE) encourages organizations to conduct learning and activities outdoors (generally means in a natural environment) in order to foster an appreciation of nature and thereby create environmentally friendly actions (Clarke & Mcphie, 2014).

Despite the fact that environmental education has developed, it still faces many doubts. It is important to note that environmental education is indeed closely related to environmental movements, environmental protection and other labels. Therefore, for a long time, the core of environmental education was considered to protect the

natural environment. The supporters of environmental education hope that it will allow people to develop a stronger sense of responsibility for the natural environment through education (Tanner, 1980). This core idea has been consistently criticized, due to its issue of providing incomplete and prejudiced information. Researchers (Sanera, 1996; Sanera, 2008; Jickling & Spork, 1998); describe that environmentalists first assume that the natural environment is in serious danger and must be saved, and that education needs to include children as the “part of solution for the Earth’s crisis”. In order to achieve this goal of motivating children to take action, environmentalists provide information that has been filtered, and then guide students to draw presumptive conclusions (Hungerford *et al.*, 1980). Researchers have criticized this behavior as a violation of the normal education process, placing students with accurate and comprehensive information in the first place (Hungerford *et al.*, 1980; Sanera, 2008). This kind of questioning not only shows the imperfection of environmental education in its ideology and teaching method, but also reveals the misunderstanding of the definition and scope of environmental education by many researchers. These vague areas make the environmental educators face conflicts at multiple levels. At the individual level, there is a conflict between individual needs and desires, which can also be called referred to as personal dilemmas (Hungerford *et al.*, 1980). At the social level, there is a conflict of interest between different groups and individuals (Hungerford *et al.*, 1980). This conflict of interest could in turn be seen as a conflict at the level of social structure, such as conflicts between political decisions and market forces or economic mechanisms (Hungerford *et al.*, 1980). The failure to resolve each and every conflict in the existing form of environmental education is another important reason why environmental education



remains as an informal field.

This research is based on the interest in environmental education and prepares to discuss the purpose and practical effectiveness of environmental education. Regardless of the type of education, its ultimate goal of education is to shape human behavior. According to the Tbilisi Declaration which was issued by the United Nations (Unesco, 1977), the goal of environmental education is divided into five basic levels: awareness, knowledge, attitude, skills and participation. Awareness refer to helping social groups and individuals gain awareness and sensitivity to the entire environment and related issues. Knowledge indicates helping social groups and individuals learn the basics of the environment and its related issues, and give them the opportunity to gain a variety of experiences. Attitude refers to helping social groups and individuals to develop respect and care for the environment and acquire motivations to actively participate in environmental improvement and protection. Skills includes the idea that social groups and individuals need to learn to identify and solve environmental problems. Finally, participation means that there needs to be opportunities for social groups and individuals to actively participate in solving environmental problems. These main goals are used to provide a sense of direction for curriculum development and teaching. Some researchers (Hungerford *et al.*, 1980; Hungerford & Volk, 1990; Hungerford *et al.*, 1998); believe that curriculum developers and practitioners also need to set sub-goals within the main goals. Sub-goals should have a clearer aim than the main goals.

This research will focus on the relevant policies, curriculum and practice in the development of environmental education at several

specific periods and current time. After considering the direction of this research and reading relevant literature, this paper proposes two research questions:

1. What is the purpose of environmental education within the context of society?
2. What factors affect the implementation of effective environmental education?

This research will firstly investigate the philosophical theory, and the research methods used will be introduced in detail in the research design section. Chapter 3 will briefly introduce the development history of environmental education and emphasize important periods and policies in the development process. This chapter will be finished by summarizing the purpose of environmental education in each key period. Chapter 4 will focus on changes in the purpose and values of environmental education. It will combine the important documents mentioned in Chapter 3 and attempt to answer research question 1 in the conclusion. Chapter 5 will analyze existing studies on environmental education, related to educational practice and effectiveness. Combining this with the purpose and values mentioned in Chapter 4, this research will conduct a second analysis of these studies. The purpose of this is to discuss the relevance of practical effectiveness to educational purposes, and consequently attempt to answer the research questions 2. The fifth chapter is a summary of the research.

## 2. RESEARCH DESIGN

After determining the direction, questions and structure of this research, it is necessary to apply the constructivism in ontology and the interpretivism in epistemology. In the pursuit of rational understanding, the core issue of the ontological focus of the basic philosophical perspective is "what is the essence of the existence of things". Ontology reflects the individual's interpretation of the composition of things (Bryman, 2012; Benton, 2001). It has two basic positions, objectivism and constructivism (Benton, 2001). Constructivism stems from the work of Jean Piaget, named *Piaget's theory of cognitive development*, and from educational psychology in Lev Vygotsky's social constructivism work (Sutton & Kelvin, 2016:35). This study states that things and meanings do not exist independently, and humans need to construct meaning (Bryman, 2012). Constructivism believes that social phenomena and their meanings are continuously fulfilled by social reactors, which means that social phenomena and categories are generated through social interaction and will continue to be revised (Bryman, 2008). Environmental education is a form of education that is constantly being revised and developed by the interaction of people and society. Moreover, environmental education also aims to have a lasting impact on the life of the educated person (Breiting & Mogensen, 1999). Therefore, this research aims to systematically investigate relevant literature and find out the curriculum and implementation of environmental education under different policies in the development process. The motivation of this is to compare the both the positive and negative impact of the purpose of environmental education on curriculum effectiveness. This research also uses an interpretative position due to epistemology focuses on the likelihood, nature, source,

and limitations of known facts (knowledge) (Bryman, 2012). In addition, interpretative researchers believe that only through language, consciousness, sharing significance and tools can reality (or social construction) be understood (Bryman, 2012). Based on interpretivism, which focuses more on qualitative research, the research involves a large number of interpretations of known literature and is consistent with six interpretative principles proposed by Klein and Myers (1999).

Above all, this research uses mixed methods, all data involved are secondary data. The research presented in this study has qualitative research, quantitative research, and mixed method research. Data collection methods include questionnaires and interviews (such as focus group and telephone interviews). The use of mixed method will be able to combine the advantages of qualitative research and quantitative research in some extent to compensate for their shortcomings (Johnston, 2017). Quantitative research is a systematic empirical study of observable phenomena through applying technologies of statistics and mathematic. The data is highly reliable and has few biases. It can be used to discover the link between the subjects of the survey (Cohen *et al.*, 2018). However, its shortcoming is that it requires closed questions which is difficult to conduct in-depth exploration (Cohen *et al.*, 2018). Qualitative research is often used to explore the definition, concept, characteristics and description of things. Open questions allow researchers to obtain more data. Researchers can interact with respondents to observe multiple levels of motivation, emotions, and practices (Johnston, 2017). But the downside is that validity is often controversial and may be biased. Therefore, the mixed method research could neutralize the disadvantages of the two data collection methods, making the research data reliable and reflecting the multi-

layered meaning of the survey object.

Secondary data analysis can be used to test hypotheses, generate new knowledge, support, challenge, and extend existing theories or discoveries (Cohen *et al.*, 2018). Secondary data allows researchers to analyze existing data from new perspectives, so the size, extent, and number of data are larger and more representative than a single researcher could collect (Cohen *et al.*, 2019; McQueen, P & MacQueen, H, 2010). Therefore, this research could further explore the purpose of environmental education by summarizing and analyzing the secondary data that has been sifted, and also have a more accurate observation of the specific implementation of environmental education. Moreover, researchers do not have to worry about the founding, and they would spend less time collecting data. Researchers could have quicker access to existing data through libraries, the internet and so on, which is faster than other data collection methods. This is also an important reason for using secondary data in this research.

This research will provide a systematic literature review based on existing environmentalist theories, policies, and empirical research. The purpose is to “identify, evaluate, and synthesize all empirical evidence that meets pre-defined eligibility criteria in order to answer specific research questions (Piper, 2013:2). Therefore, in this research, the scope of the literature review is within the journal articles and government documents in the fields of education, psychology, and sociology, which were all found in the library and journal database. There are certain inclusion criteria for the empirical researches in this research. Firstly, they must be articles that provide basic or empirical evidence for this research (the subject of environmental education).

Secondly, the articles, books, and government documents used must have been published in the 20<sup>th</sup> and 21<sup>st</sup> century. Thirdly, it must include both qualitative and quantitative researches. Fourthly, the articles must be based on research from around the world, preferably researches in the United States and the Europe countries such as United Kingdom, etc. In the process of searching for potential articles or books, "environmental education", "historical development", "curriculum setting", "environmental education goals" and "conservation education" are used as keywords for finding basic theories and empirical research of environmental education. "Globalization", "sustainability", "effectiveness" and "behavioral change" are used as key words to further define the characteristics of environmental education. "UK environmental education policy", "US environmental education policy" are keywords that defines the geographic characteristics of education policy. "19<sup>th</sup> century", "20<sup>th</sup> century", "21<sup>st</sup> century" as keywords used to describe a limited timeline. After obtaining sufficient literature, the research will be classified according to the timeline, and the type of the research (divided into theoretical research, curriculum research, and government documents).

All the information collected in this research was legally obtained from the resources of the University of Glasgow Library. The reporting and presentation of all information is responsible and accurate. Moreover, there were no ethical issues that threaten any person or organization during the process of research.

As for the limitation of this research, the use of secondary data may cause a certain degree of bias. Firstly, the data collected from the existing research may be used for different research purposes,

hence, the data may not cover the population sample that this research intends to investigate. Furthermore, the data may not be detailed enough. Secondly, the study could not guarantee the validity and accuracy of all available research data. In addition to this, as a systematic literature review, there are limitations in the text that can be analyzed in this certain type of research. Although this research hopes to maintain objectivity by expanding the amount of reading and adopting multiple styles of data, the analysis and understanding of the literature could be relatively subjective.

### 3. A BRIEF HISTORY OF ENVIRONMENTAL EDUCATION

This chapter will briefly review and highlight key historical events and policy documents in the development history of environmental education. By the end of this chapter, the historical period and reasons that are the focus of this research will become apparent. The purpose of this chapter is to provide a timeline for the following chapters, and the research will be conducted according to the time points highlighted in this timeline.

#### 3.1 Environmental education in early stage

Humans have been studying nature for a long time. In 1762, the Genevan philosopher Jean-Jacques Rousseau published his educational philosophy *Emile*. It illustrated his educational proposition in the form of a novel, which stated that people should return to nature rather than just memorize scientific knowledge. He emphasized that education should include learning about the natural environment (Carter & Simmons, 2010; Fraser *et al.*, 2015). From the end of the 19<sup>th</sup> century to the beginning of the 20<sup>th</sup> century, educator Wilbur S. Jackman with a group of naturalists such as Anna Botsford Comstock, Louis Agassiz and others led the natural study movement. They advocated for a change in the approach of teaching scientific knowledge in schools and emphasized “study nature, not books” (Hungerford *et al.*, 1998). They believed that natural study could help to identify and express the true nature of things. Among them was Anna Botsford Comstock, the first educator who brought students and teachers to the outdoors to learn about nature. She pointed out in her work *The Handbook of Nature Study* that natural study provides children with practical knowledge and



experience, supports them to understand and familiarize with the way and power of nature, and more importantly, develops children's perception of the world. Due to the concern for the future of the next generation and nature conservation, the natural study movement is highly valued and highly anticipated in the society at the time (Hungerford *et al.*, 1998).

From 1930 to 1940, due to inadequate cognition of the plain ecology, severe drought and improper farming methods, and a large scale sandstorms formed in the plains of the United States, more than 500,000 Americans became homeless and the economy was affected for a long period of time. This period is referred to as the Dust Bowl (Griswold, 2012). In order to respond to and prevent natural environmental disasters caused by lack of natural awareness and excessive human activities, the protection education movement began to be supported by the Federal Natural Institution and many non-governmental organizations. In 1935, American state Wisconsin took the lead in enacting state laws requiring teachers to be fully prepared for natural resources protection (Cartrier & Simmons, 2010). Since then, in order to enable the public to use and manage natural resources wisely, many states required schools to enroll conservation education as part of the curriculum (Carter & Simmons, 2010). The change has not only occurred in the United States. After the World War II, the rapid development of industries and the depletion of natural resources caused the worldwide public to become aware that if environmental problems were not taken seriously, potential environmental disasters would soon occur across the world. Meanwhile, people were made aware that solutions to environmental problems would involve radical changes in values, lifestyles and personal behavior. This meant that

education methods had to face a comprehensive change. In 1948, Thomas Pritchard, the Deputy Director of the Nature Conservancy in Wales, used the term “environmental education” for the first time at a meeting of the International Union for the Conservation of Nature which was held in Paris (Carter & Simmons, 2010; Finch, 2008; McCrea, 2006; Malone, 1999). In 1969, Dr. William Stapp developed and published a definition of environmental education with his students at the University of Michigan:

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

(McCrea, 2006)

### **3.2 The development of environmental education with relevant policy support**

In the 1960s, two landmark books raised awareness for the American public; daily agricultural activities and industrial production were the root causes of the deterioration of the natural environment (Carter & Simmons, 2010; Malone, 1999). Rachel Carson, an American marine biologist, author, and conservationist published her famous book *Silent Spring*, which showed that in 1957, the US Department of Agriculture used pesticides synthesized from DDT and other fuel oils to eliminate ants (Hungerford *et al.*, 1998; Malone, 1999; Nash, 1989). They used aircrafts to spray large quantities of pesticides from the air, covering the farm. In the book, Carson describes in detail the destruction of the ecosystem caused by pesticides. Pesticides poison wild animals directly and also causes pollution to soil, water and air.

Once these toxic chemical materials enter the biosphere, the living environment of humans is be damaged. Carson also predicts that an over-reliance on pesticides, which aim to prevent the spread of disease through pests (such as malaria), will cause pest resistance, which in turn makes pests more difficult to control (Lytle, 2007; Rickinson, 2001).

Although *Silent Spring* caused great controversy at the time, the data and case studies cited in the book were not recent, which meant that scientific organizations had already discovered these phenomena for a while. Carson was the first person to bring these findings together and reveal them to the public (Griswold, 2012). Therefore, the book has also received attention and support from professionals in various fields. It is worth noting that Carson insisted in her speech that the promotion of DDT by the Department of Agriculture and chemical industry is not only due to its effectiveness as pesticides, but is also a coping strategy to the excess of products and labor (Lear, 1997:358). During the World War II, DDT was used, in the form of powder, as an effective means of controlling scorpions. After World War II, pilots were unemployed and product supply exceeded demand, leading the US government and industry to seek new markets for DDT among American consumers (Lear, 1997:355). In response to this book, an environmental movement that bans the use of DDT in the United States and limits or prohibits the use of DDT worldwide has gradually expanded (Lytle, 2007).

In addition to Rachel Carson's *Silent Spring*, the *Quiet Crisis* written by Steward Udall, the Secretary of the Interior appointed by President John F. Kennedy, also caused a sensation. The book presents readers with a new perspective on environmental heritage. Udall stated that due to the existing environmental crisis, and the upcoming

environmental crisis, some part of the environmental legacy of the United States had been lost, and what remained would be lost in the future (Finch, 2008). These two books brought about unprecedented environmental legislation and actions in the past decade, from nongovernmental organizations to Congress and the White House. The implementation of a series of bills expresses the concern for the relations between the natural environment and human beings, and the concern for the environmental pollution that was caused by human actions (Carter & Simmons, 2010). For example, the Wilderness Act of 1964, the Land and Water Conservation Fund Act of 1965, the Endangered Species Preservation Act of 1966. Additionally, the first major environmental law of the United States, the National Environmental Policy Act (NEPA), signed in 1970 by President Richard M. Nixon, which is still in effect until now. These bills revealed that humans began to evaluate our behavior through the way of legislation as a precaution that human activities cause irrevocable effects on environment (National Environmental Policy Act, 1969).

As mentioned above, environmental education was put on the agenda as a natural education in the 1930s. The teaching approach of biology, botany and other sciences have been extended to nature, and students are encouraged to learn scientific knowledge through direct observation (Carter & Simmons, 2010). For the next 30 years, environmental education appeared in the classroom in the form of conservation education, in order to communicate to the public that land and animals need protection (McCrea, 2006). In August 1970, as a requirement of NEPA act (1970), the National Advisory Council for environmental education was established. After discussing in detail the role of education in the environment, Congress passed the

Environmental Education Act (McCrea, 2006; Carter & Simmons, 2010). This Act requires that the Environmental Education program be included in the curriculum of all public schools (NEPA, 1969). Although the Act has only been in effect for five years, it has spurred state governments to join the EE project (including the development of EE curriculum, budget funding and talent development etc.) (Nash, 1989).

Internationally, the United Nations held a meeting in Stockholm in 1972 to issue a Declaration of the United Nations Conference on the Human Environment, also known as Stockholm Declaration (Handl, 2012). The Declaration contains 26 principles, the 19<sup>th</sup> principle of which states that environmental education is of the utmost importance to the younger generation and adults (UNEP, 1972). At the same time, the mass media should also disseminate educational materials to avoid fomenting the deterioration of the environment (UNEP, 1972). The Declaration laid the foundation for promoting people's understanding of environmental education. On the basis of the Declaration, in October 1975, the Belgrade Charter was produced by the International Workshop on environmental education. It extended the basic framework of the Stockholm Declaration, increased the objectives, goals and principles of the environmental education program, and pointed out that the audience for EE includes the general public (Handl, 2012). The specific content will be discussed below in conjunction with the specific implementation of Environmental education. These international conferences meant that environmental education had entered the international arena, but the ultimate code of EE as an international undertaking is the Tbilisi Declaration, which is the outcome of the world's first Intergovernmental Conference on EE that was held in Tbilisi, Georgia, USSR in October of 1977. The document clearly and definite

states what environmental education is and what environmental education supposed to be (Handl, 2012). Many of the goals set out in the document laid the foundation for work in the field of EE. This document will also be discussed below. The Belgrade Charter and the Tbilisi Declaration are two groundbreaking sessions of environmental education on the world stage, which directly influenced the subsequent environmental education research, and many researchers mentioned these two documents in their research.

The environmental education gained recognition in the 20<sup>th</sup> century, and it has begun to emerge into the international arena. Due to the attrition it has received, the field has rapidly developed since its conception. However, after entering the 21<sup>st</sup> century, the US attitude toward environmental education became less positive. During President Ronald Reagan's term, the Omnibus Budget Reconciliation Act passed in 1981, virtually eliminated all aspects of the Nixon-era Environmental Education Act (Cater & Simmons, 2010). In the last period of the 20<sup>th</sup> century, an anti-environmental movement, also known as Sagebrush Rebellion or Wise-Use Movement halted the development of environmental education. Its purpose was to promote the expansion of private property rights and reduce government regulation of public property (Kline, 2007). Supporters of this movement sought more access to public land in order to expand the use of commercial and public interest. The movement involved the privatization of land, the demands of western economic growth, the use and management of public land, and the issue of grazing. Some of the supporters believed that the bias of environmental movements biased towards urban elites ignored the demand and views of rural people, therefore, causing rural residents to be affected by environmental regulations (McCarthy, 2002). It is worth

noting that this movement was supported by resource extraction industries (such as British Petroleum, Chevron, Marathon Oil) and US Agriculture Bureau, Yamaha, General Electric, National Cattlemen's Association (McCarthy, 2002). In the perspectives of some of the supporters, the movement was considered to achieve unrestricted economic growth. The supporters carried the belief that environmental and social issues could be alleviated through the use of market economy and modern technology. As a result, the progress made by environmental education during the 1960s and 1970s quickly deteriorated. The Reagan administration was considered by some researchers to be the beginning of a long-term downturn in environmental education (Carter & Simmons, 2010; McCarthy, 2002; Itin, 1999).

In the first decade of the 21<sup>st</sup> century, the US Congress re-approved The Elementary and Secondary Education Act in 2001, which is also known as No Child Left Behind Act (NCLB). Its premise was to set high standards and establish measurable goals in order to improve individual outcomes in education (Carter & Simmons, 2010; Gruenewald & Manteaw, 2007). The Act required states to develop basic skills assessments and requires public schools which receive federal funding to conduct statewide standardized tests for all students each year. The purpose of the Act was to ensure that all children had fair and equitable access to high quality education. This objective could be achieved by ensuring high quality academic assessment, accountability, teacher training, curriculum, teaching materials and achieving a high degree of consistency of state academic standards (Newton, 2001). Environmental education, however, was ignored and marginalized in this Act. It is clear that it is difficult to provide measurable standard

testing for environmental education content, and there may be a “participation gap” in the implementation process (Gruenewald & Manteaw, 2007; Sanera, 2008). Under the high pressure of the NCLB Act, the stress to prepare for assessment inhibits the development of outdoor, experiential, project-based learning or community or community-based learning (Gruenewald & Manteaw, 2007). Fortunately, regardless of whether the social environment makes environmental education difficult to integrate into traditional educational discourse, environmental educators are still looking for new development space in this field. Despite the indifference of the government attitude is, environmental educators, writers and researchers continue to advocate, demonstrate and explain the importance of students interacting with the natural environment. For example, Rivkin (2000) emphasizes the positive impact of children’s perceptions, emotions, memories, academics performance and sense of responsibility through outdoor experiences. Chawla (2003) studied how children’s environmental awareness affects their control over the environment. Kuo and Faber (2004) studied the “green” or natural environment to reduce the symptoms of children with attention-deficit/hyperactivity disorder (ADHD). Moreover, in 2005, Richard Louv analyzed the causes of the reduced contact with nature of children in American society and the influence of this natural deficiency on children in his work *Last Child in The Woods: Saving Our Children from Nature-Deficit Disorder* (Knapp, 2000). The book reawakens an interest in outdoor, natural, and environmental education, a movement to encourage and fund environmental education. It was referred to as the No Child Left Inside Movement. The aim of the movement included improving the environmental literacy of kindergarten and 12<sup>th</sup> grade children and cultivating children’s ability of understanding, analysis and solutions to



environmental challenges (Chawla, 2003; McCarthy, 2002). In response, in 2008, the U.S. House of Representatives authorized the No Child Left Inside Act. This Act encouraged schools to include environmental outdoor activities as part of their curriculum and provided states with resources to train teachers and develop research programs in order to enable students to gain a deeper understanding of the role of the environment as a natural resource (Gupta *et al.*, 2019). The Act is supported by the National Parks Conservation Association, League of Conservation Voters, National Council for Science and the Environment, National Science Teachers Association, and other organizations in America.

### **3.3 Conclusion**

In summary, from the changes in national policies to the social response, the purpose and form of environmental education are changing with the needs of the current times period and society. In the early days of its development, environmental education struggled to construct ideology and overall structure. Its incompleteness, or uniqueness, has made environmental education controversial. It has, however, gradually progressed and been inspired by western philosophy. Due to the exploration of natural science, and relatively close connection between human and nature in that period, the society thought highly of environmental education. After entering the 20<sup>th</sup> century, humans realized that citizens lacked knowledge of the natural environment, and the inappropriate use of the environment could cause serious natural disasters. Therefore, in the first half of the 20<sup>th</sup> century, conservative education was recognized as a form of environmental education by the U.S. government and schools. During this period of

time, the purpose of environmental education was to educate the public about the environment and cultivate citizens' understanding of the environment and natural resources. In the middle of the 20<sup>th</sup> century, humans had to face many social and environmental problems such as war, industrial development, and limited natural resources. Therefore, environmental education was expected to solve these environmental problems and change the behavior of citizens. In the late 20<sup>th</sup> century, environmental problems had deteriorated to the point where they could no longer be neglected, humans became aware of the environmental damage caused by industrial products. The government implemented a series of environmental protection acts and environmental education evolved rapidly, gaining worldwide recognition. However, at the beginning of the 21<sup>st</sup> century, environmental education became marginalized, and its teaching methods conflicted with the educational needs of the time. The traditional education, with a focus on academics, prevailed whilst environmental education, that had been developed in the last 30 years, was still an expanding field (Carter & Simmons, 2010). The evolution of environmental education is inseparable from the changes in the natural environment and the growing awareness of human's own consciousness. It has not stopped at the point of concern for the environment, more goals were developed and cited in the system of environmental education.

## **4. ENVIRONMENTAL EDUCATION CENTERED ON “ENVIRONMENTALLY”**

According to the historical development mentioned in the previous chapter, the focus of environmental education is to protect the natural environment or to solve environmental problems in the United States and on the world stage. The value and ideology of environmental education have been misunderstood due to the core topic always surrounding environmental protection or solving environmental problems. In this chapter, the content of two important declarations and one charter will be explored, especially in relation to the objectives and guiding principles of environmental education. The purpose of this analysis and change of guiding principles are extremely meaningful. Following this, the chapter will focus on the new goal of environmental education: sustainable development. The pros and cons and potential values of this goal will be analyzed based on existing research and theories. Finally, there will be a summary to attempt to answer the first research question.

### **4.1. The purpose of environmental education within the Stockholm Declaration, the Belgrade Charter and the Tbilisi Declaration**

As mentioned above, in the international arena of environmental education, there are three important declarations that provide direction and guidance for countries to develop environmental education. The first is the Stockholm Declaration, which consists of seven declarations and 26 principles. Among them is Principle 19 (mentioned above), which clarifies the importance of environmental education (Chawla, 2003). Furthermore, other provisions have laid the

foundation for the development of environmental education. The first point is to prevent environmental damage, mainly in principle 21. According to the Charter of United Nations and International Law, countries should ensure that their own jurisdiction or control activities will not cause other damage to the state's environment (Knapp, 2000; UNEP, 1972; Breiting & Mogensen, 1999). The second point is a common but differentiated responsibility, stated in Principle 23, which clarifies the differences in the development and environmental contexts of different countries. It emphasizes that developed countries have a responsibility for sustainable development because of the technical and financial resources they control. The rest of the Declaration also presents the concept of sustainable development and equality (Handl, 2012; Pooley & O'Connor, 2000; UNEP, 1972). It is worth noting that in this Declaration, the center of environmental education is to pay attention to the natural environment, and hope to disseminate educational information about improving the environment through education, with the aim of improving people's sense of responsibility for the environment.

In the Belgrade Charter, environmental education is considered a means of solving global environmental problems. Participants at the UNESCO workshop presented a global environmental education framework that stipulates that environmental education should be a lifelong education. It also states that it needs to provide a useful role in improving lives and protecting the environment by understanding the main issues of the contemporary world (UNESCO, 1976). It can be seen in this framework that environmental education at that time had begun to develop comprehensively. Although the focus was still on the protection of the environment, there were also concerns about the

impact of knowledge, skills, attitudes and motivation on current environmental issues. The Charter proposed two initial goals; the first is to improve the basic concepts of “quality of life” and “human well-being” and aim for each country to increase its inclusiveness for other cultures in its cultural and environmental context. The second is to improve all ecological relationships, the relationship between man and nature, and between people. The goal of this is to coordinate the biological environment with the man-made environment while maintaining human well-being and social development (UNESCO, 1976; Stevenson, 2007; Tanner, 1980). It is worth noting that these two goals led to the expansion of environmental education, emphasizing the interaction between people and nature, which therefore emphasized the role of people in the entire ecological environment. In contrast to the definition published in 1969 (by Dr. William Stapp and his students), the original definition represented a human-centered educational ideology that emphasized the initiative and dominance of human behavior in the natural environment (Carter & Simmons, 2010; McCrea, 2006). In this Charter, the emphasis was placed on environmentally-centered educational thinking, pointing out the relationship between human life and social development and the ecological environment. Moreover, in the guiding principles proposed by the Charter, environmental education needed to consider the environment as a whole, including man-made, political, economic, legislative and cultural aspects. It also confirmed the interdisciplinary nature of environmental education. Therefore, in the Belgrade Charter, the center of environmental education was still focused on the natural environment.

On the basis of the Charter, the Tbilisi Declaration issued in 1977

gave a clearer description of environmental education. In the education target category, based on five basic objectives of awareness, knowledge, attitude, skill, and participation, environmental education was guided at the national, regional, and global levels. The Declaration clarified the content of the Belgrade Charter and made the guidance more informative and specific. This was in order to encourage relevant research to develop environmental education curricula and projects that were consistent with the content of the Declaration. For example, in Guiding Principle 3, it was clarified that environmental education should adopt an interdisciplinary approach and use the specific content of each discipline to achieve a harmonious and balanced perspective. This guidance directly influenced many studies on the development of environmental education courses and educational practices in the existing education system (Tbilisi Intergovernmental Conference on Environmental Education, 1978). In addition, the Declaration added four principles:

1. Relate environmental sensitivity, knowledge and problem-solving skills. Value clarification to every age, but with special emphasis on environmental sensitivity to the learner's own community in early years;
2. Help learners discover the symptoms and real causes of environmental problems;
3. Emphasize the complexity of environmental problems and thus the need to develop critical thinking and problem-solving skills;
4. Utilize diverse learning environments and a broad array of educational approaches to teaching, learning about and from the environment with due stress on practical activities and first-hand experience.

( Tbilisi Intergovernmental Conference on Environmental Education, 1978)

It is worth noting that these principles emphasized the change of values. Environmental education itself also had a unique value that affected learners' sensitivity to the environment, knowledge, and problem-solving skills of all ages, especially for early learners (Davis, 2009; Hungerford et al., 1980; Stevenson, 2007). Studies have shown that this would be expressed in the sensitivity of learners and their own community environment. This encouraged the impact of environmental or community emotions on children in subsequent studies. These principles also clarified that environmental education needed to develop critical thinking and respond to some researchers' criticism of environmental education in instilling tendentious ideas into students. The environmental education embodied in the Declaration presents a complete, globalized form that requires each group of society to cooperate and understand. In this form, environmental education was no longer a controversial informal discipline but evolved into a new trend of education that required every aspect of society to participate. It can be seen that the core of the "environment" not only represented the natural environment but also included the human social environment. The expansion of the concept of the environment meant that the educational concept centered on creating and maintaining the environment began to penetrate into the existing educational conception.

#### **4.2. Environmental education centered on "sustainability" and its resistance**

The development of environmental education was halted at the beginning of the 21<sup>st</sup> century, but the attention of the "environment" topic in the world has since made environmental education regain its

acknowledgement. In 1992, "sustainable development education" was launched by Agenda 21 (Chauvet de Andrade, 1999; Klein & Myers, 1999). Due to the fact that its development inevitably involved the environment, environmental education began to transform towards a sustainable development approach. This change did, however, encounter resistance after its conception.

The resistance was considered as the integration of the concepts of sustainable education and environmental education. The concept of environmental education has gradually become more complex over time. This is because humans have become more aware that social, political and economic conditions strongly influence the living conditions of humans and our surroundings (Chauvet de Andrade, 1999; McCarthy, 2002; Tibury, 1995). Environmental education gained more sensitive recognition as people became more aware of the state of the world's crisis. The shortage of finite resources, the destruction of the natural environment, the Greenhouse effect, and other global environmental crises all brought large scale recognition to environmental education. Additionally, the series of unsolved international social crises such as extreme poverty, racial discrimination and garbage disposal further developed a growing concern for the social environment. These circumstances led to the development of a new model of human-natural relations (Jickling & Wals, 2008; Kline, 2007), in which humans had no sense of domination and control. In this concept, humans are not superior to any other existence; if humans want to remain active on earth, then it is necessary to respect the natural environment. This new model came from the idea of three great revolutions in human history (Chauvet de Andrade, 1999; Gupta et al., 2019; Stevenson, 2007). The first revolution was the Neolithic era in



which the emergence of agriculture and animal husbandry enabled humans to settle on this planet and survive for thousands of years. The second revolution was the industrial revolution, which continued for centuries as technology rapidly developed and human lifestyles dramatically changed. Although the third revolution has not yet arrived, it will be a radical transformation of the human development pattern, which is necessary to maintain the living conditions of humans and other creatures on earth today and in the future. The rapid growth of the population and the problem of resource shortage require that this change occurs soon before it is too late. This revolution, like the previous two revolutions, needs to be recognized and developed in many fields, and should fully absorb the various cultures in human society. This complex process involves changes in individual and collective attitudes, and some of these changes are directly dependent on the evolution of human morality and ethics. Therefore, the development of a beneficial educational model will contribute to this moral and ethical evolution and the sustainable lifestyle of human beings. It is worth emphasizing that the concept of "sustainability" is inextricably linked to the "globalization" process. Some environmental education researchers (Hattingh, 2002; Jickling, 2001; Jickling & Wals, 2008) question the assimilation impact of globalization. It is influencing the education policy agenda on a global scale; however, this trend has not yet been critically discussed. The question of whether environmental education will become a tool for globalization to foster citizenship that serves the neoliberal agenda remains unexplored. To paraphrase, making sustainable development a new goal of environmental education and using sustainable development education as a tool to change people's direction in a predetermined direction will leave less room for reflection and self-determination.

The nature of education must be discussed here. According to Shepard (2000), the essence of education can be a tool for conveying certain facts, skills and values, as well as information, ideology or consumer preferences, designed by the government, special interest groups or industries. In this view, education is about social reproduction and social efficiency, and learning is a closed process. Knowledge is transmitted unilaterally from teachers to students in order to promote the integration of the younger generation into the current system. In contrast, Shaul (1970), stated that the essence of education is "the practice of freedom". Knowledge and understanding are built together in a social context. The learning model is open; teachers provide self-determination and autonomy for learners. The knowledge is adaptable, and the curriculum is created by learners communicating with each other. This process will generate critical thinking and empower learners to participate in the creation and transformation of their world. One of the functions of environmental education is to enable students to critically recognize how they view the world. The aim of this is to foster citizen participation in social and environmental issues and decision-making processes (Bonnett, 2007; Dale & Newman, 2005; Peper, 1995). Consequently, whilst some international conferences (such as the UNED-UK conference in 2002) are already discussing how to promote sustainable development education, and how to set standards on the potential ideology of sustainable education, values and worldviews have not been clarified (Hattingh, 2002; Fien *et al.*, 2001). It is controversial to focus on sustainable development as a curriculum, and some environmental educators (Jucker, 2001; Rammel, 2003; Wals & Jickling, 2002) are resistant to including sustainable development as a part of environmental education due to its blurred boundary.

On the other hand, there is the opinion that sustainable development is based on complex adaptive epistemology, which in itself is an interdisciplinary tool (Reeves, 1999; Gunderson & Holling, 2002). This feature is consistent with the characteristics of environmental education. Sustainable development is defined as a development that meets current needs without affecting the ability of future generations to meet their own needs (Ballantyne, Connell & Fien, 1998). The accuracy of this definition has changed drastically in recent times, and constructive dialogue has been formed based on the controversy generated by sustainable development (Dale & Newman, 2001). The result of this dialogue was a general definition of sustainability rather than a specific one. It is now defined as a process of coordinating three essential conditions: the ecology must live within the global biophysical carrying capacity; the ecology must maintain biodiversity; and society must ensure the development of democratic management systems (Dale & Newman, 2005). In practice, sustainability education aims to enable students to apply knowledge in a variety of unpredictable situations. Although, under the traditional educational model, students lack the opportunity to implement sustainable development into practice. Under the new educational model, students can work together to create solutions that will help improve student engagement and environment literacy, and foster student attitudes and critical thinking. Therefore, the concept of sustainability could be used as a separate direction in the field of environmental education. It could be used to refer to environmental education methods for educational practice activities. For example, some practical courses mentioned by Jucker (2001) allow students to think and research across disciplines, using real-world examples, and combine their knowledge and research in discussions

with online groups. Fien (2002) provides students with an overview of natural science and social science methodology, requiring students to criticize articles and identify shortcomings in those methodologies. These practices are based on the existing methods of environmental education, adding to the concept of sustainable development. This expansion helps environmental education to pay more attention to the interaction between society and the ecosystem and deepen the interdisciplinary thinking on complexity.

### **4.3 Conclusion**

In this chapter, the change in the purpose of environmental education has undergone three phases. The first phase was human-centered, the second phase was environment-center, and the third phase was sustainability-centered. Although the central point has changed, the purpose of environmental education is constantly enriched. Hence, the first research question in this study can now be answered. In the early stage of development, environmental education as a discipline closely related to the environment and aimed to improve people's sense of responsibility for the environment in order to achieve environmental protection. After the Belgrade Charter and the Tbilisi Declaration, environmental education developed five basic objectives within a complete framework: awareness, knowledge, attitude, skill and participation. With a unique face of interdisciplinary and lifelong study, combined with knowledge in a variety of fields including man-made, political, economic, legislative and cultural, a new respect for the environment was developed. The change of the purpose from person to environment represented the transformation of the relationship between human beings and the environment. Human

beings not only pay attention to their living environment (including the natural environment and social environment) but also pay attention to the living environment of other creatures on earth. In the values of environmental education, human beings are not the masters of the world, but like all other creatures, enjoy the equal resources of the earth. In recent environmental education, sustainability has joined the goal of environmental education, which is based on the previous goal that humans care about the present and future, the living environment of themselves and all other creatures. The debate on the purpose and values of environmental education and the nature of education has developed the purpose of environmental education from simple to complex, leading to a positive outcome of these debates.

## **5. PRACTICE AND EFFECTIVENESS OF ENVIRONMENTAL EDUCATION**

This chapter will discuss the effectiveness of environmental education in different periods by presenting existing researches on environmental education practices and effectiveness. First, research on relevance issues will be presented, and researches related issues will point the way to more complex and specific research. This chapter will describe in detail the research background, methods and results of existing research, and discuss the limitations of the research, combined with the discussion of the purpose of environmental education in the previous chapter, to assess the embodiment of environmental education in the existing researches. Secondly, research on effectiveness issues will be presented and the potential factors affecting the effectiveness of environmental education will be discussed based on discussed researches. Finally, this research will attempt to answer research question 2.

### **5.1 Relevance in Environmental Education**

The first research to be presented was published in 1973 (Hounshell & Liggett, 1973), with the background that the Elementary and Secondary Education act of 1971 funded the "Cooperative Environmental Education Project" (of the school system in Madison County, North Carolina. The program established a western north Carolina environmental education center that provides all available course materials, references, journals, and books to students from nine school systems, especially sixth grade students. To investigate the relationship between human and environment and attitude towards

environment. The research randomly selected 1881 sixth-grade students from nine system served by the project. The research used the Environmental Knowledge and Opinion Survey (EKOS) as a tool, which were design by a team of psychologists and science education experts. After the field text was carried out on the 500 teenagers, the test has been submitted to be analyzed by an environmental education expert group, finally 65 test questions were identified, among them, 35 questions for measuring knowledge, 30 questions for measuring the attitude. In the knowledge section, the higher the score, the higher the degree of mastery of environmental knowledge; in the attitude section, the higher the score, the more positive the attitude to the environment (Hounshell & Liggett, 1973). The results of this research showed that in the sample of 1881 students, 906 girls scored extraordinary higher on attitude section than boys, while there was no significant gender difference in knowledge section. In urban schools A, students' score higher on both section than students whose school in rural. There was no obvious difference between urban school B and rural school. Students in urban school C also scored extraordinary higher in both sections than rural school students.

The analysis based on former researches indicated that there was a correlation between personal cognition of the environment and human beings' effect on the environment. Human beings' effect on the environment, however, was also influenced by their positive attitude on environment. Moreover, there was a low average score showed in the part of knowledge test, which might indicate that it was necessary to improve students' comprehension on specific knowledge.

In the project, the relationship between attitude and knowledge was explored. However, how these two factors would influence the

effect of environmental education was not interpreted, which was a field that the future research might work on.

Other researches (Uzzell, 1994; Duvall & Zint, 2007; Liefländer *et al.*, 2015), meanwhile, explored the function that parents made on their children's cognition in terms of environmental education. For example, an interview was taken based on 42 UK children in Surrey and Weybridge (Uzzell, 1994) to improve children's behaviors in terms of recognizing environmental problems, evaluating environmental issues and solving these problems. Each children participant would finally receive a report with personal experience on whether they made environmental-friendly behavior and whether a conversation relating to environment was occasionally raised with parents. The result showed that few conversations relating to environment were happened with no possibility existing that children could reverse parents' attitude or behaviors. Uzzell (1994) in another project, at the same time, separated 105 children into three improving group and one normal group. Each participant from improving group was allocated a kit with the instruction which could test water quality. Extra factors, however, were laid in the first improving group. Those factors were a questionnaire given to the parents, a local map, a diary acquiring parents and children to work together, and a camera which could record their positive behaviors on environment. An interview was taken after a few months on all participants and parents involved. The result in the first improving group showed that 53% children saying they had a conversation with parents on school's environmental courses and water pollution. 84% parents based on the questionnaire said they had discussions relating to environment with their children. Only 19% children, however, could raise their own opinions on the environment.



The project did not reveal the relation between environmental knowledge and the effectiveness of taking behaviors, but compare with the other two improving groups, there was a huge difference from the first improving group in terms of parents effective recognition on children's environmental courses. On the other hand, more behaviors relating to improving environment were discovered in all improving groups compared with the normal group.

Uzzell's research (1994) explored the effect that parents brought about on children's environmental education, which were similar with the works of Leeming *et al.* (1997), Ballantyne *et al.* (1998) and Ballantyne, Fien and Packer (2001). All these researches found out that both children's and parents' recognition, attitudes and behaviors relating to the environment would get improved after the involvement of parents (for example, asking them to join the project with children together in the interview). The truth was parents and children would make a permission in saving water resources, and more conversations would take place in the family relating to environmental protection.

The researches above were usually lasting from 6 to 12 months, so the results only indicated the short-term effect that the environmental project brought about. Joining the project could improving both parents' and children's attitude and behaviors on environment, but long-term project was required so that this kind of improvement could be permanent. Schools, community and local institutes may give more support and advises so that more students and parents could be involved.

A generation effect could be revealed based on the researches above. It was the environmental education project that proved parent's

values, attitudes and decision could be positively influenced by children (Ballantyne *et al.*, 1998; Ballantyne *et al.*, 2001; Newton, 2001). As Ballantyne *et al.* (1998) argued that the students would share environmental knowledge with their parent, and the encouragement should be the first strategy for environmental education project. It is worth noting that the influence of parents on children's environmental awareness, attitude, knowledge and behavior is rarely studied by environmental education researchers. Although many studies have mentioned the influence of parents on children, however, they are not in the field of environmental education.

## 5.2 Environmental education practices for long-term effectiveness

The concept is widely used in environmental education practice by enabling children to learn knowledge to change their attitudes towards specific things and to develop their ability to solve problems. In the study by Drissner *et al.* (2010), an outdoor learning school called "Green Classroom" was introduced. It was established in 2000 at the university of Ulm and was estimated to be used by 2500 students each year. The philosophy of this design is to let children learn nature outdoors, and the researchers commented that this is the most effective and enjoyable way. The basic principle behind this philosophy is that we can only protect the world we recognized. The course attempted to develop the values and feelings of close to animals and plants, so that students' understanding of the environment, animals and plants could touch their soul, in order to cultivate the emotional bond between children and the environment.

The green classroom course was designed to first allow students to

explore primitive habitat animals such as grasslands, forests and lakes in the botanical gardens, giving students knowledge about the habitat and allowing them to observe the animal's appearance, characteristics and lifestyle. This approach was to create opportunities for students and the environment to make contact. Secondly, students were asked to draw the animals, its food chains and habitats they have observed. There is evidence (Fawcett, 2002) that students were sympathetic and caring for animals in this process. Teachers will provide information about animals and habitats to help students understand the importance of habitat and how to treat animals that live there.

Drissner *et al.* (2010) investigating whether attending a green classroom can influence students' awareness and emotions about these animals for a long time. The study selected 104 fifth-grade students, and 49 (experimental groups) had participated in the green classroom project, while other students did not participate. The study asked all students to write an article about small animals, such as insects and invertebrates, on the subject of describing the understanding of small animals in their environment. Drissner *et al.* (2010) classify the article according to 4 situations: 1. Scientifically correct expression (such as the attributes of the animal described; spider has eight legs) 2. Scientifically incorrect representation (such as the age of the ladybug can be seen by the spot on their back) 3. Positive emotions (such as small animals are really cute) 4. Negative emotions (small animals are annoying).

The results of the study were: the number of incorrect expressions of students who had not experienced "green classroom" was higher than that of the experimental group; the students in the text group showed more correct expressions and more positive emotions. These

results demonstrate that students were more interested in small animals and show an understanding and love of animals after been intervened in the “green classroom” course. After establishing a positive relationship with the animals, students were more likely to be willing to learn more about the animals and the ecological environment around them. The study expresses the goal of making long-term environmental education possible by establishing a positive relationship between students and animals.

Unlike the previous study, the effectiveness of the experience was explored in the study by Ballantyne *et al* (2001). The study is based on an environmental education curriculum that examines the effectiveness of these programs in terms of student learning outcomes, and the intergenerational impacts when discussing their learning experiences with parents or other community members. The difficulty with this study was that children, family members or community members receive different types of education (Strom, 1998), and students receive knowledge about environmental education in schools, but most adults rely on the media for environmental education. It should be emphasized that the five main purposes of environmental education need to be effective, and educational achievements are likely to meet the standards. From the perspective of consciousness, the motivation of adults (especially parents) is mainly due to the desire to protect the earth’s resources for future generations. Studies have shown that children can positively influence their parents’ values, attitudes and decisions (Axinn & Thornton, 1993; Homer, 1993; Mangen et al., 1988).

The study selected 284 students (including 192 girls and 92 boys) from 9 schools, and each student was given a questionnaire for parents

to complete, and the researchers received 177 responses. The researchers asked the parents that if they were willing to participate in a telephone interview, and a total of 177 people agreed to participate. Moreover, most of the parents who answered were women, accounting for 78% of the total. The research program involves a range of issues (such as air pollution, water pollution and energy usage), and uses a variety of teaching methods such as practical activities, student data collection and local environmental actions. The study collected a number of quantitative and qualitative data on environmental knowledge, attitudes and behaviors of students and parents, the quality of communication within the family, the degree of student preference for the course and the level of student learning. Within 2 to 4 weeks after the end of the course, students are required to complete a written questionnaire under the supervision of the teacher and contact the parents to invite them to a 15 minutes telephone interview. Telephone interviews and written questionnaires involve asking students how the knowledge they have learned from the course will be useful to their lives and asking students which parts of the course they want to change. Asking the parents how the course affects children's behavior and attitude. Asking parents if children have discussed the content of the course with them and what topics are discussed.

The study analyzed the qualitative and quantitative data collected from the interviews and concluded that 95% of the students reported they have learned useful knowledge from the courses they attended. Among them, 72 % of students reported having facts or information about a particular topic, 18% of students who learned the skills to detect environmental problems, and 35% of students who had a new attitude toward environmental issues. In addition, 32% of students indicated that they changed their behavior by participating in this

course. 73% of students reported having to discuss the content of the course with their parents. Parents report that the children's attitudes and behaviors were indeed changed by the course. The children were interested in the knowledge in the course and were willing to share them with parents. Furthermore, the children were excited about the practice and would share the experience gained from the activity with the parents. Some of parents would even be invited to review the activities with children.

The study results showed that the school's environmental education programs can effectively promote intergenerational discussion and development of families and communities, in other word, students and their parents share their learning and environmental attitudes, would bring positive changes to the family practice of environmental education. And this change has been found among students of all age groups, which supports the universality of the discovery. Furthermore, the study also pointed out that the approach of environmental education is different from the test-oriented approach. Students' interest would be easily attracted due to the environmental education approach contains many interesting activities. However, if the curriculum practice of environmental education does not discuss the essence and actions of the problem with the students, it may cause the discussion to stay at the level of "I like this kind of activity". Just letting students experience the fun, and not promoting the motivation to stimulate students to solve problems, cannot change the behavior of students though environmental education.

### 5.3 Conclusion

In this chapter, a total of five environmental education practice researches were presented, which included qualitative, quantitative, and mixed methods research, and the research methods included questionnaires and interviews. Although the main purpose of these studies was to explore the impact of environmental education on the relevant variables in practice, such as knowledge attitudes, and communication of intergeneration, or explore the effectiveness of environmental education curriculum practices. These studies are related to this research, despite the purpose and direction of researches are different, after analysis of these studies in details, this research found useful information to answer research question 2.

Firstly, schools need to develop a variety of environmental education experience-based activities to stimulate students' interest in environmental education. Teachers should provide students with relevant knowledge in time, encourage students to interact with the environment, the animals and plants that living in the habitat. This part is the cornerstone for effective implementation of environmental education. Secondly, schools need to encourage students to record relevant data (such as changes in water quality, small animals' appearance and habits, climate changes, flower odors and patterns, etc.) in the classroom (or during the experiential activities). In this section, students will be cultivated a positive relationship with the environment, which will directly affect students' attitudes and feelings (such as preference and caring) about the animals, plants and ecological systems. It would increase the effective period of practice. Thirdly, encouraging students to communicate with their parents in the curriculum practice, or develop practical interactions between parents

and children. This strategy enables environmental education to generate a certain frequency of discussion within the family and community, and topicality would also increase the effectiveness of the curriculum, even after the end of the course, environmental education could have an impact on families and communities. According to the educational goals and guiding principles set out in the Tbilisi Declaration, environmental education needs to be effective for people of all ages. students would obtain information on environmental education in schools' activities, and parents could gain the information of environmental education through discussions with their children. Finally, discussing the nature of environmental issues with student would promote the development of student's critical thinking ability and the formation of values. Avoiding students' interest in environmental education is only to stay at the "interested" stage, but to encourage students to take practical actions, to change behaviors and attitudes that are not conducive to the environment in life.



## 6. CONCLUSION

This research attempts to answer two research questions through the methodology of systematic literature review. The research questions in this study involve the exploration of the propose of environmental education and the effectiveness of educational practice. From the perspective of historical progress, the development of environmental education is closely related to social science and technology, international policies and changes in the global environment. In the first phase, environmental education is the science of natural research, with the aim of educating students to recognize force and knowledge in nature. In the era when the human's living environment and the natural environment were still quite close, environmental education has the values of science, therefore, it has received the attention from the society. In the second stage, environmental education, as conservation education (also a response strategy for natural disaster), has entered the public view. In the United States, a series of natural environmental disasters such as sandstorms and drought caused by insufficient cognitions of the ecological environment have made it possible to learn "use environmental resources wisely", it became an important course. In the third phase, environmental education suffered a second world war. After the war, natural resources were consumed in a large amount, and the industry began to develop rapidly. Many environmental problems continued to ferment but they were never paid attention to and solved (such as the DDT event). Under the support of some policies, environmental education has been vigorously developed. In the fourth stage, environmental education received the attention of the international community, the Declaration of the Human Environment Conference of

1972, the Belgrade Charter of 1975, and the Tbilisi Declaration (1977) which are known as the statute book of environmental education. After three international declarations, environmental education has developed an even more clear structure of its ideology and a more complete purpose. Environmental education is considered to be a life-long subject that is independent, interdisciplinary, life-based discipline that aims to understand and protect the environment, centered as improving people's environmental values, and purpose of fostering environmentally friendly and responsible social citizenship. In the fifth stage, the forces of globalization have given the purpose of environmental education a new direction, which is sustainable development. Although environmental education is marginalized at this stage (early 21<sup>st</sup> century), integrating sustainability into the basic goals of environmental education will bring broader space for the development of environmental education. The most important point is that the rise of this new goal also means that the human-centered thinking has gradually evolved into the idea of equality of all things and sharing of resources with all the animals and plants.

Through a series of historical key events review and analysis of important documents, this research believes that the purpose of environmental education within the context of society is to continuously optimize human values and self-awareness, achieve harmony with the environment (contains all the creatures in the natural environment) and solve all problems in the social environment through the integration and struggle of mainstream social ideology and social development. Moreover, these goals need to meet the needs of social development to a large extent in order to ensure that human beings can continue to survive, it also has a tendency to attempt to solve some

social problems.

In exploring the effectiveness of environmental education, this research presents five studies on environmental education practices, three of which (Hounshell & Liggett, 1973; Scultz, 2002; Uzzell, 1994) were tests of the relevance of environmental education, they mainly examined the role of knowledge and attitude in the environment, and the impact of intergenerational influence in environmental education practices. The rest of two studies aimed to test the effectiveness based on environmental education practices by using quantitative research and qualitative research. In the educational practice of "Green Classroom" (Drissner, 2010), the study found that the emotional bond between children and the environment will influence the effectiveness of educational practice. In the study by Ballantyne et al. (2001), they found that the development of environmental education practice interaction involving parental involvement will promote the information, attitude and values from environmental education to be disseminated in different age groups, and to encourage students to communicate with family members and community members by stimulating the interest of students. In addition, the study puts forward the importance of cultivating student's ability to think critically and act eco-friendly. By carefully analyzing the background, rationale and conclusions of these studies, this research found the factors that can influence the effectiveness of environmental education practices. Getting enough knowledge, participating in interesting activities, building positive relationships with animals and plants, communicating with parents, reflecting on your attitudes, and finally changing your lifestyle. The effectiveness of environmental education practices is built up in many details, the lack of any step will have an impact on

effectiveness. Therefore, environmental education requires multi-field and multi-role cooperation.

This study is based on a systematic literature review. Therefore, this research lacks observations and experience on real environmental education practice activities. When analyzing existing research data and theories, there may be a more subjective understanding. In reviewing the historical events of environmental education, this study only selected historical events that were consistent with the research theme, and did not fully display its development history. Moreover, the age of existing research data, samples and data analysis methods are different, which means this research is also inevitably limited by the defects of existing research data. In addition, this research is limited by time and authority, it is impossible to browse more policy documents, curriculum settings and practical research on environmental education. Hence, the literature selected in this research may be not very representative.

Finally, this research believes that the goal of environmental education can be divided into sub-goals at multiple levels based on the existing five main goals, but each sub-goal cannot exist alone. Therefore, in order to test the rationality of the target, it is necessary to refer to the holistic theory and distinguish it with the dynamic, social development needs and social morality. In the future research, the concept of "Holism" can be used to optimize the objectives and structure of ideology of environmental education. Moreover, there is still something should be explored between the practice and goals, perfecting the gap between purpose and practice may be of great help to environmental educational practice. Finally, the effectiveness of

environmental education surveys usually range from 6 months to 1 year, and there are few long-term follow-up surveys in the field of environmental education. For this reason, the practice of long-term observation of environmental education will be of great help to the testing of effectiveness in the environmental education practice.

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