Wang, Yinghui

UNDERSTANDING THE ENVIRONMENTAL EDUCATION CURRICULUM IMPLEMENTATION GAP THROUGH TEACHERS' BELIEFS

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Author
Wang Yinghui

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Given the serious environmental crisis happening in China, Environmental Education (EE) has been given more and more attention by the government, educators, public and researchers. EE in China has been increasingly promoted in recent years especially within the formal education system. However, there are always difficulties and problems involved in bringing Environmental Education into the classroom. This study focuses on the Chinese National Environmental Education Curriculum implementation issues. It aims to understand the curriculum implementation gap between the intended written curriculum and the teachers’ perceived curriculum. As the teacher is in the center of this phenomenon, there is a special focus on the teachers’ beliefs system. The research questions leading this study are 1) What are the teachers’ beliefs about EE? 2) What are their perceptions on the implementation of the EE Curriculum? 3) What role does the National EE curriculum play in teaching practice?

From a phenomenological approach, a qualitative study has been conducted in Tianjin, one of the major cities in China. Four primary school teachers from two public primary schools have been interviewed. The beliefs generated from common sources are mainly discussed as a way to make generalizations. Thematic analysis has been applied to analyze the interview data. The results are presented around three themes which are the teachers’ beliefs on EE, pedagogical practice of EE and EE curriculum application. The research has shown that the teachers have a basic understanding of EE but insufficient teaching methods, and the results also revealed some negative attitudes among the teachers. The curriculum mainly serves as a framework and theoretical reference with very limited use in teaching practice. Based on this study, the EE curriculum implementation gap is mainly generated from the teachers' insufficient pedagogical content knowledge (PCK) and the marginal status of EE in the system. Therefore, it has been suggested that in order to narrow the implementation gap, improvements should be made to teaching training, educative curriculum design, parents' education and the legalization of EE.

Due to the fact that the study has been conducted in the context of Tianjin, the results cannot be generalized to the whole country. But the results can set up references for other cities that share similar educational and social conditions with Tianjin.

Keywords
environmental education; China; curriculum implementation; primary school education; teachers' beliefs; Tianjin
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1. INTRODUCTION

Take a quick scan through any major news website and it is not hard to see that air pollution in China has been widely reported, especially in the Beijing area. In recent years, from my personal experiences with these environmental problems, I realized how much environment can affect people's health and daily lives. Gradually, I became very motivated to make efforts towards this environmental crisis and try to understand how issues of the environment are being dealt with in Chinese politics, businesses, society, and education. The issue at the center of this research project focuses on China, but environmental problems are truly a global issue; air and water contamination do not know national boundaries, and the acts of one group of people can surely impact other groups. So, a valuable study within the field of Globalisation and Education has to concern itself with how some schools today are using Environmental Education (EE) as a way to help prevent environmental problems.

EE can be generally understood as a way to help people gain knowledge and awareness of the environment and acquire positive attitudes and practical skills to solve environmental problems, moreover, build environmentally friendly values. This concept can be traced back to the 18th century. Philosophers such as Jean-Jacques Rousseau and Louis Agassiz believed that education should involve the study of the environment and nature (McCrea, 2006). EE has become globally known since the 1972 United Nation (UN) Conference on the Human Environment in Stockholm, Sweden, during which the Stockholm declaration was generated. It has addressed the importance of EE in coping with environmental issues around the world. Stockholm Declaration was improved during the Belgrade charter which was held in Belgrade, Yugoslavia in 1975. Another remarkable declaration has to be mentioned here is the Tbilisi declaration of October 1977 which has improved Stockholm declaration and the Belgrade charter and, more importantly, provided a new definition of EE and its objectives to guide the development of EE globally. In 1987, the concept of sustainable development was first officially stated in the Brundtland Report which is also known as “Our Common Future”. According to the Brundtland Report, sustainable development implies "meeting the needs of the present without compromising the ability of future generations to meet their own needs" (Brundtland, 1987). In 1992, the UN Conference on Environment and Development held in Rio de Janeiro has formulated
Agenda 21, a significant instrument, which provided framework for sustainable development and serves as a comprehensive blueprint of action to be taken globally, nationally and locally by organizations of the UN, governments, and major groups (UN, 2012).

In China, to cope with the increasingly severe environmental crisis EE has been discussed, developed, and gained great attention from the Chinese government, the public sphere, and the academic field. In 1990 EE was first included as part of extracurricular learning in the Chinese school system, with activities including recycling and cleaning up local areas. Since that time, EE has gradually integrated into many school subjects and activities in the Chinese formal education system. Following the idea of Rio de Janeiro Earth Summit in 1992, the state Council approved China’s agenda on the environment and population, titled “China’s Population, Environment and Development in the 21st Century.” It explicitly stated that “teachers should encourage the idea of sustainable development in student’s thinking. Incorporate information about natural resources, ecology, environment and sustainable development into primary school nature courses and middle school geography classes” (China, 1994, 6.21). To this end, the Chinese Ministry of Education put many resources into promoting the understanding of EE in terms of knowledge, attitudes, and values.

However, in practice environmental education has tended to emphasize environmental knowledge whereas the cultivation of environmental skills and values were relatively ignored (Ministry of Education, PRC, 2003a). To reinforce the importance of EE and enhance the environmental awareness, the Curriculum for special topics education on environmental education for primary and middle school students was published in 2003 (which will be referred as National EE Curriculum in the rest of this paper), along with an instructional guide, The National Environmental Education Guidelines, to support the implementation of this environmental education curriculum. According to the guidelines, EE should be either integrated into different core, compulsory school courses or conducted as an independent course through the local, school-based courses (Ministry of Education, PRC, 2003a). For example, one of these main core courses, Morality and Society/Life, is taken by students from grade 1 to grade 6. There are certain elements of the Chinese national curriculum for this course that are related to Environmental Education, even
though the language in the curriculum does not explicitly use the term “Environmental Education.” For example, the main teaching and learning points are related to an individual’s role in the community, in the country (China), and in the world. Within this context, students learn about their roles in EE, especially in the aspect of positive emotional cultivation.

However, the implementation of the National EE curriculum is facing many obstacles. The intended curriculum, that the Chinese Ministry of Education plans to have delivered to each student across China, is not always instructed according to this national plan. Wang (1998) summarized the causes of the unsuccessful implementation of the curriculum in his study as lack of time and teaching materials, insufficient financial support, lack of recognition from the head of school (1998, p 159-220).

To further investigate the implementation the National EE curriculum, a major focus has been paid on the gap between the intended curriculum and implemented curriculum that is provided to the primary students in Tianjin, China. There are three focus on this study, namely the location of Tianjin, the primary level and the special group of teachers. The focus of this study is on Tianjin for two reasons. One is because the researcher has grown up in this city and has rich knowledge of the local context in terms of education and society, which provides advantages for better understanding phenomena embedded in this context. The other reason is little research has been done in this city concerning EE and its implementation.

There are three reasons for giving the focus on primary level. First of all, in China, according to law, primary school is part of the nine year compulsory education which means every citizen has experienced this period of education in their lives. Due to its massive scale, attention should be paid on primary sector. Second, studies have proved that early age is best time for people to formulate their habits and attitudes (Kimaryo, 2011, p.22) which are essential learning goals in EE. Therefore, the study is targeted at the primary level. Third, primary education in China is influenced least by examinations. This gives more teaching and learning space for the topics which are not included in the examination system, for example, arts and EE.
In order to understand the issue of curriculum implementation, teachers were used as the target sample group in this study. Teachers stand at the intersection between the intended, national curriculum from the Chinese Ministry of Education and actual implemented curriculum in the classroom in Tianjin. Many studies have been conducted about teachers’ roles in the implementation of curricula. This study focuses on the teacher's beliefs regarding EE and how it can be both taught and cultivated in young learners. Pajares (1992) suggests that a “teacher’s belief system reflects personal theories about the nature of knowledge and knowing that, in turn, influence teachers’ curriculum decision making and teaching approaches” (Pajares, 1992, p. 10). Similarly, Cotton (2006) suggests that “unless curriculum developers take account of teachers’ belief in designing new curriculum materials, those materials are unlikely to be implemented in their intended format” (Cotton, 2006, p. 30). The study of teachers’ belief is crucial to the successful implementation of a curriculum, and it will therefore be a critical component of this research project.

1.1 Research Questions

The study is conducted around three main research questions. They were used to guide the research process, with each question focusing on a) the teacher’s belief system regarding EE and b) the pedagogical practice of EE and c) implementation of the National EE curriculum. These three research questions were helpful in obtaining the necessary qualitative data for this project:

1. What are the teachers’ beliefs about EE?
2. What are their perceptions on the implementation of the National EE curriculum?
3. What role does the National EE curriculum play in teaching practice?

1.2 Structure of the Study

The study contains six chapters. Chapter 1 aims to lead the readers into this paper by introducing the basic information of the research and the rationale behind this project. Research questions and the structure of the whole thesis are included as well. Chapter 2 provides detailed background knowledge that is relevant to the study, which includes introduction of the development process of EE in China, introduction of Chinese educational system and curriculum. Then it continues with the focus on the primary
curriculum and how EE is integrated in the curriculum. At last, basic information of Tianjin is provided. Chapter 3 aims to illustrate the theoretical framework of this study, within which the key concepts are defined and main theory is discussed. Chapter 4 relates to methodological issues. Within this chapter the research approach is discussed. Data collection and analysis methods are discussed and the research procedure is also described. In the end, the discussion focuses on validity, reliability and ethical issues. Chapter 5 shows the main findings of this project and they are presented in three themes which correspond the three research questions. Chapter 6 further discusses the findings towards the research aim which is to understand the EE curriculum implementation gap. In addition, implications from the findings are also presented.
2. RESEARCH BACKGROUND

To begin the discussion on these topics of EE, curricula, and teachers’ beliefs, it will be beneficial to introduce a general research background and some existing studies with relevance to this one. This chapter begins with a brief introduction of Chinese primary education system and then illustrate the primary education curriculum. Following the introduction of the curriculum, how EE integrates in the curriculum is further explained. Finally, information about primary education in China and EE in the context Tianjin is provided.

2.1 Chinese Education System

Figure 1: Chinese Education System (Wang 2012, p. 16)
The Chinese education system operates on a massive scale and is characterized by centralized structure and imbalance development; the Ministry of Education sets the Chinese national curriculum to be taught in schools. With 1.3 billion people, China undoubtedly has the largest education system in the world. At the primary level, there were 90 million school-age children in 2014 and 99.8% of them were enrolled in primary school (Ministry of Education, 2015). Driven by the force of the compulsory education law which came into effect in 1986, Chinese basic education has achieved universalization. The Education Law of the People’s Republic of China formed the basis of administrative structure in the education system. Compared to many of its western counterparts, the structure of the Chinese education system is quite centralized. This is evident in the three-tiered curriculum system within which only 16-20% curriculum space is allocated for local and school-based curriculum (Wang 2012, p.19). In general, the central government monitors the process and provides basic guidelines at the macro level. Local government is authorized the administrative power to develop detailed education plan and implement national policies. In addition, the imbalanced education development between different regions and between urban and rural schools is very evident in China. Cheng's (2009) study on Chinese basic education reveals a great gap between rural and urban schools and also between different regions. One of the main reasons for this problem is the inequality of economic development in different regions. Other problems that cause the educational gap are the distribution of educational resources and different educational policies from one region to another.

Primary education, as the first part of the nine year compulsory education, lasts six years. After this period, students have to participate the entrance examination (zhongkao) in order to continue their study in secondary school. Recently, the Ministry of Education has passed the implementation suggestions of improving primary to secondary school examination exemption work in early 2014, which marked the starting point of the retiring process of secondary school entrance examination in China. In the later notice complemented to this implementation suggestion called notice on improving secondary school examination exemption in major cities work, Tianjin has been chosen to be one of the implementation pioneer cities together with other cities including Beijing, Shanghai, Jilin, Sichuan, and Guangdong, etc.. This means, according to this notice, by 2017, in these areas 95% of the primary students will be exempt from lower secondary school entrance examination and
enroll in the secondary school within the school district. The exemption of the core subjects’ examination will lower the attention that has been paid on subjects like Mathematics and Chinese Language Arts. This fact provides a great opportunity for the marginalized subjects to gain more focus.

2.2 Primary Curriculum

Chinese national curriculum is very broad, because China is such a big country and each area has its own cultural and geographical features. The broadness allows the local education governments implement the national curriculum according to the local context. The idea of the curriculum is often translated into textbooks. The local government has the right to choose a suitable version of the textbooks that best suit the students’ needs.

<table>
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<th>Grade</th>
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<td>8</td>
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<td>9</td>
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<table>
<thead>
<tr>
<th>Chinese Language &amp; Literature</th>
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</thead>
<tbody>
<tr>
<td>Mathematics</td>
</tr>
<tr>
<td>Arts (Music, Fine Arts)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Morality &amp; Life</th>
<th>Ideology &amp; Morality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Morality &amp; Society</td>
<td>History &amp; Society (History, Geography)</td>
</tr>
<tr>
<td>Science</td>
<td>Science (Biology, Physics, Chemistry)</td>
</tr>
<tr>
<td>English</td>
<td>English</td>
</tr>
</tbody>
</table>

Integrated Practice Activity

<table>
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<tr>
<th>Physical Education/Sports</th>
<th>Sports &amp; Health</th>
</tr>
</thead>
</table>

Table 1. The New Curriculum Scheme for Compulsory Education in China (Wang 2012, p. 20)

The current curriculum used in Chinese primary schools was introduced in 1993 by the Teaching Scheme (Curriculum) for Full-time Primary and Secondary Schools (Pilot). According to this teaching scheme, curricula are divided into two types: national-based and
local-based. In June 2001, the Ministry of Education issued the *Outline of Basic Education Curriculum Reform*, in which the curriculum was further divided into three tiers, in addition to national and local-based curriculum, school-based curriculum has been introduced (Wang, 2012). The aim of the local and school-based curriculum is to suit the local education needs and promote a sense of individualism and creativity within the local and school context.

**2.3 EE in the Curriculum**

The National EE Guidelines suggests four different ways to implement EE in primary and middle schools. The first suggestion is implementing EE as a cross-curricular theme integrated into different subjects. Second, EE can be presented through Integrated Practice Activity in which community service is an important element. Third, EE can be carried out as an independent subject as a locally-arranged or school-based course. The last one is to merge EE into student daily management.

- **Suggestion #1: EE in Science and Morality and Society/Life**

Among all the subjects, Science and Morality and Society/Life have the strongest connection to EE. The Chinese national educational curriculum requires students to take a Morality and Life course in grades 1 and 2, and a Morality and Society course during grades 3-6. Within these two subjects there are many topics related to EE. For example, Morality and Society course contains topics like *Our Community, Our Country, and Our World*. Within these topics, the curriculum intends for students to learn about environmental issues and attain a positive attitude to the environment. While there is no specific EE course built into the national curriculum, the Ministry of Education advises teachers to teach about environmental issues within the Morality and Society/Life topics in grades 1-6. For example, one of the main objectives states that “Morality and Society is to help the students cultivate positive emotions to the natural environment and gradually form the environmental awareness”. (Ministry of Education, 2011)

Students start to take Science from Grade 3. In Science, basic knowledge of chemistry, geography, and biology are included. In spite of the scientific knowledge, a special focus
has been paid on the students’ attitudes and values to the nature and to teach them how to appreciate nature.

- Suggestion #2: EE in Integrated Practice Activity

According to the *Outline of Basic Education Curriculum Reform* issued in 2001 (Ministry of Education), Integrated Practice Activity was introduced as a compulsory subject from primary school to high school (see Table 1 above). With this Integrated Practice Activity, students are taught key skills for work and life, including information technology, basic research processes, community service, and labor skills. It aims to foster students’ creativity and problem-solving ability through social engagement and project-based learning (PBL). Due to the nature of this course, Integrated Practice Activity has formed a very suitable platform to incorporate some EE topics. The National EE guidelines suggest that EE topic can be set up through community service.

- Suggestion #3: EE as a local course or school course

EE according to the National EE guidelines can also be set up as an independent subject as a locally arranged course or school developed course. For instance, in Qingdao, a seaside city in north China, EE special focused on marine education has been set up as its local course in primary schools. Another example is in Nanjin, EE will be designed and included as its local course after the *Measures for the Promotion of Environmental Education in Nanjing* came into effect.

- Suggestion #4: EE integrated into student daily management

Based on the National EE guidelines, each school should develop its own rules and evaluation system in order to encourage the students and the school staff to get involved in EE. Moral education in Chinese education system is highly valued. Thus, in spite of relevant course such as Morality and Life/Society, it is institutionalized in the form of Moral Education Office which is responsible for the students’ social behavior supervision and management. Therefore, the integration of EE through student management is very often seen as the responsibility of the Moral Education office, even though it is not mentioned in the National EE Guidelines.
2.4 EE in Tianjin

With a population of about 15,469,500 in 2015 (Qu, 2016), Tianjin is one of the major cities in China. It is located along the west coast of the Bohai Bay and is about 120 km from Beijing. Because of its geographic position and strategic importance, Tianjin has become one of the directly-controlled municipalities of the People’s Republic of China. Due to many reasons, Tianjin has developed very fast and has become one of the first-tier cities in China; it contains relatively richer educational resources compared to many other regions.

Primary school in Tianjin lasts six years and follows the national curriculum described above. Some basic data is shown here in Table 2.

Table 2. Educational Statistics of Tianjin

<table>
<thead>
<tr>
<th>Year</th>
<th>Category of school</th>
<th>Number of schools</th>
<th>Number of teachers and staff</th>
<th>Number of students</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>Primary</td>
<td>842</td>
<td>42301</td>
<td>573187</td>
</tr>
<tr>
<td></td>
<td>Secondary</td>
<td>326</td>
<td>53457</td>
<td>436820 (lower secondary 267214)</td>
</tr>
<tr>
<td>2015</td>
<td>Primary</td>
<td>849</td>
<td>43128</td>
<td>602144</td>
</tr>
<tr>
<td></td>
<td>Secondary</td>
<td>329</td>
<td>53489</td>
<td>427035 (lower secondary 261474)</td>
</tr>
</tbody>
</table>


The first national environmental protection meeting was held in 1973 and marked the start of EE in China and specifically in Tianjin. In recent years, most of the major Chinese cities have been suffering from serious environmental crises, especially in Beijing and Tianjin region. To cope with the environmental problems and build a clean living environment, more and more attention has been paid to EE. In 2012, Regulations of Tianjin Municipality on Environmental Education which is the first official document of EE in Tianjin was issued by the Standing committee of the People’s Congress of Tianjin Municipality. This document emphasized the role of EE not only as a reactionary measure, but as something to be introduced in classrooms in an effort to cultivate an environmentally-friendly set of attitudes, beliefs, and actions among students. The document explicitly mandated that,
according to the national EE curriculum requirements, primary and lower secondary schools in Tianjin should have at least four periods in each year dedicated to EE.

In the context of Tianjin, the primary school teaching scheme includes Chinese Language Arts, Mathematics, English, Morality & Life/Society, Arts, Physical Education, Integrated Practice Activity and operational locally-arranged or school arranged course (see table 1.). Based on the National EE curriculum, EE in primary school should be integrated into all the subjects, as outlined in suggestion #1 above. However, due to various reasons the process of integrating EE into the core subjects is facing many difficulties. In Wasmer’s (2005) analysis of Chinese EE, he pointed out that the main restriction of the implementation of EE in big cities is the lack new pedagogic approaches (Wasmer, 2005, p31). Teachers and curriculum developers need to find and deliver fresh ideas and successful teaching cases that are relevant to today’s environmental issues. To better understand the implementation situation in Tianjin, four primary school teachers from two different public primary schools in Tianjin are chosen as interview participants for a qualitative study on this issue. The detailed information of these two schools and the process of the study will be provided in section 4.3.2.
3. THEORETICAL FRAMEWORK

The aim of this research is to investigate the gap between the intended and implemented EE national curriculum by understanding primary school teachers’ beliefs on EE. So in the beginning of this section, key concepts, including Environmental Education, Curriculum and Beliefs are defined. On the basis of understanding the key concepts, I further provide a detailed explanation and discussion of the research theory.

3.1 Environmental Education (EE)

Based on the general understanding, Environmental Education (EE) is seen as a learning process in which people can gain knowledge and awareness of the environment and acquire positive attitudes and practical skills to solve environmental problems, moreover, build environmentally friendly values.

The definition of EE adopted for this study was developed by Dr. William Stapp and was published in the first Journal of Environmental Education in 1969. The reason Stapp’s definition was chosen is because of its widespread and profound international influence. At the Intergovernmental Conference on Environmental Education in Tbilisi in 1977, where UNESCO laid out the objectives of EE and its guiding principles, Stapp’s definition was introduced and has been widely adopted by many professionals and organizations in the field since that time. According to the epilogue of “The Concept of Environmental Education” by Stapp (1977), EE is defined as

“a process aimed at developing a world population that is aware of and concerned about the total environment and its associated problems, and has the attitudes, motivations, knowledge, commitment and skills to work individually and collectively towards solutions of current problems and the prevention of new ones.”

Stapp (1977) also identified five main objectives of Environmental Education:

- Awareness— to help individuals and social groups acquire an awareness of and sensitivity to the total environment and its allies problems;
Knowledge-- to help individuals and social groups gain a variety of experiences with the total environment and to acquire a basic understanding of the environment, its associated problems and humanity's critical responsible presence and role in it;

Attitudes-- to help individuals and social groups acquire social values, strong feelings of concern for the environmental and the motivation for actively participating in its protection and improvement;

Skills-- to help individuals and social groups acquire the skill for working toward the solution of environmental problems and to foster a dialogue between these groups; and,

Participation--to help individuals and social groups develop a sense of responsibility and urgency regarding environmental problems to ensure appropriate action to help solve these problems and avoid future problems.

In academia, researchers and scholars have been discussing the meaning of EE for decades, especially after the emergence of the concept of Sustainable Development. The relationship between EE and Education for Sustainable Development (ESD) became another area of debate. Based on the Brundtland Report from the United Nations World Commission on Environment and Development in 1987, sustainable development is defined as “development that meets the needs and aspirations of the present without compromising the ability of future generations to meet their own needs.” UNESCO defines ESD as “a vision of education that seeks to balance human and economic well-being with cultural traditions and respect for the earth’s natural resources.”

It is not hard to find the evidence of EE within the ESD definition. Some key international documents (UNESCO 2004; WCED 1987) suggest that ESD is an evolved version of EE. Government policies often stay in line with the international documents. So EE is often perceived as a part of ESD by the public as well as some scholars. According to Hogan and Tormey (2008, p. 7–8, cited from Lee and Efird, 2014, p. 5),
“The concept of ESD is a combination of EE and development of education for sustainable development essentially combines development and environmental education by adding social and economic perspectives to environmental education and environmental concerns to development education...But...there are those within the ESD movement who see it primarily as an outgrowth, and a refocusing, of EE.”

However, viewing ESD as an extension of EE has been met with criticism from environmental educators. For example, Gadotti (2008, p. 30, cited from Lee and Efird, 2014, p. 5) argued that ESD is based on neoliberal market ideology and ESD is not superior to EE. So far in the field of EE, scholars have not reached a consensus about definition of EE and its relationship to ESD. In summary, EE and ESD have a complex relationship and are seemingly always mentioned together in this particular area of education.

It is important to understand some of these background discussions and debates on definitions of EE, as the first component of the research project asks the interview participants to explain their own understanding or definition of Environmental Education. The understanding of EE in this research project is based on the above definition. In order to gain a closer perspective on EE in a Chinese context, the definition, objectives, and curricular learning goals for primary EE in China shall be provided.

In the Chinese EE national curriculum, the aim of EE has four main components:

To lead the student to acquire the awareness of environmental problems in their family, in the local community, in the country, and in the world.

To realize the interrelationship between each individual, the society, and nature.

To help the student acquire environmental knowledge and skills and cultivate positive emotions, attitudes, and values towards the environment.

To encourage the student be active in sustainable development decision making and become a responsible citizen with social responsibility.
The Environmental Education learning goals for primary school students are as follows:

Grade 1-3:
Approach nature, draw close to nature and learn to appreciate it. Learn about the relationships between nature and daily life and get to know the first, easy rules of environmental protection.

Grade 4-6:
Learn about the environmental problems in the community and school area. Study the relationship between human actions and the state of the environment. Adopt environmentally friendly behavior.

Significantly, the objectives from the Chinese EE curriculum basically cover all the elements of the UNESCO (1977) version. On top of that, more attention has been paid to the human relationships and social responsibility. EE is not only seen as an education for the environment but also in some sense a kind of citizenship education, which is why in many areas the “Morality and Society” class has a particular focus on environmental issues.

3.2 Curriculum

Curriculum in general refers to “what is taught in school”. Usually, it is presented as an official document issued by government which includes details about goals, objectives, content, teaching techniques, evaluation, assessment, and resources.

As mentioned in chapter 1, the purpose of this research is to investigative the gap between the intended curriculum and the implemented curriculum, with particular attention paid to the teachers’ belief systems as a key factor in the delivery of Environmental Education content in the classroom. To this end, van den Akker’s (2013, p59) work is used in this study to illustrate the three dimensions of curriculum in practice: intended curriculum, implemented curriculum, and attained curriculum.
Firstly, the *Intended* curriculum contains both the *ideal* curriculum and the *written* curriculum. The ideal curriculum refers to the rationale or basic philosophy underlying a curriculum, while the written curriculum, as the name implies, means the real product of the curriculum and it is usually in the form of a document. To relate this to the specific Beijing-Tianjin research case in this study, the Intended curriculum is the collection of content knowledge and skills that the Ministry of Education in Beijing wants each student in Tianjin to learn in school. Beijing lays out the ideal curriculum but provides the written curriculum to school across China, and both of these are part of the Intended curriculum that the Ministry of Education advocates.

Secondly, the *Implemented* curriculum includes the teachers’ *perceived* curriculum, in other word, the curriculum interpreted by the teachers, and the *operational* curriculum which is the actual process of teaching and learning. In the present study, the perceived curriculum regards the Tianjin teachers understanding and beliefs about the National EE curriculum; the operational curriculum refers to how they apply this document in their class. The focus of this research is laid on the perceived curriculum in order to identify the curriculum implementation gap whereas the operational curriculum is beyond the scope of this study.

Finally, the *Attained* curriculum consists of the *experiential* curriculum and the *learned* curriculum. The former refers to the learning experiences from the learner perspective and the latter one means the learning outcome.

The focus of this study is on the intended and implemented curriculum. To be more specific, the transition of these two dimensions, the written curriculum and the teacher’s perceived curriculum. In practice, there always is the gap between these two dimensions and the gap occurs during the process of teachers perceiving the written curriculum, so that teachers become the key to this study.

### 3.3 Teachers’ Beliefs Guiding the Pedagogy

Based on the understanding of the concept of EE and the curriculum division in practice, in this section I will further explain the concept of teachers’ belief and why it is important for
the curriculum implementation. In addition, the study scope of teachers’ beliefs and the sources of the beliefs are discussed. Finally, the relationship between teachers’ beliefs and their pedagogical content knowledge is clarified.

3.3.1 Teachers’ Belief System

People’s beliefs generally can be described as a mental representation of an attitude positively oriented towards the likelihood of something being true. It is constructed from each individual's experiences (Pajar 1992) and associated with knowledge, attitude, logical reasoning, and personal taste, among other factors.

A wealth of research evidence has shown that teachers’ beliefs have a fundamental influence on the curriculum implementation. For example, Cotton (2006) conducted a study about geography teachers’ belief on controversial environmental issues in UK secondary schools which suggested that unless curriculum developers take account of teachers’ beliefs in designing new curriculum materials, those materials are unlikely to be implemented in their intended format. Similarly, the results form Cronin-Jones (1991) study also showed that teachers’ beliefs strongly influenced the curriculum implementation process.

Therefore, to understand the mechanism behind the form of individual beliefs becomes a key component in understanding Environmental Education in the classroom. However, because of the complex nature of individuals’ beliefs, scholars have encountered difficulty in defining such a term, with Pajares (1992) claiming that the study of beliefs “does not lend itself to empirical investigation.” Teachers who are tasked with bringing EE into the classroom also bring with them a belief system that is based not only on knowledge of Environmental Education, but on past experiences and socio-cultural contexts as well. These all work together to influence a teacher’s methods and pedagogy implemented in the classroom. One major goal of this study is to examine the teachers’ beliefs about EE and how these beliefs are related to the implementation of an EE curriculum in the classroom. In order to examine the gap that exists between intended and implemented curriculum, it is important to first understand what kind of role teachers’ beliefs play in the creation of this gap.
3.3.2 Define the Scope of Teachers’ Beliefs

Even though this is an educational study, the target domain of teachers’ belief is not limited to educational beliefs, because each individual’s belief system develops out of different situations, experiences, and contexts. All of the aspects of one’s beliefs are intertwined, which makes it difficult to isolate educational beliefs from a holistic belief system. For this reason, we seek all the possible relevant sources within and beyond the teacher profession, which can help explore the deeper meaning of each teacher's educational beliefs. In order to generalize the findings, only the beliefs that can be traced back to a possible common source are emphasized in this study. These beliefs are probably derived from the local context, such as the mainstream social values and education system.

3.3.3 Influential Sources of Teachers’ Beliefs

It is argued that people’s beliefs are directly and indirectly influenced by many factors such as media, personal experience, critical events, and influential people, among other factors. Each individual's beliefs are derived and constantly constructed by their experiences and the embedded context (Mansour, 2009). As the goal of this study is to understand the EE curriculum implementation gap and hopefully obtain some reflective suggestions to facilitate the implementation. To this end, the beliefs formulated from common sources are the primary focus, including institutional factors and social factors. In the institutional dimension, beliefs are formed within an institutional frame. Through each person’s lifetime, we constantly move in and out between different institutions. Teachers’ personal school experience may contribute a lot to his or her early beliefs about schooling, whereas institutional facilities could be a factor in a teacher's pedagogical beliefs. Extending the belief sources to an even broader dimension, it is not hard to imagine how social climate can facilitate the formation of each individual’s beliefs. As a general coping mechanism, people tend to gravitate toward the mainstream feelings and belief systems as kind of a social survival skill. For most people, there is a natural inclination to want to find common ground with the people in a community, so the social dimension also plays a key role in the development of beliefs. Comparing to these common sources, private sources are also very important for the understanding of personal beliefs. However, beliefs derived from private factors are usually hard to investigate, difficult to change and less possible to make general conclusions. Therefore, they become the minor focus of this study.
People’s beliefs are constantly constructed by interactions that occur institutionally or socially. Only few factors are truly internal such as health, personality, or family. Other than that, our beliefs can actually be seen as a reflection or response to the outside world. This means, as practice changes, people tend to adjust their beliefs to adapt the changing external environment. A study about changing teachers’ beliefs about problem solving, conducted by Luft (1999 cited from Mansour, 2009), reveals that beliefs and practices are allowed to interact and align.

3.3.4 Teachers’ Beliefs and Pedagogical Content Knowledge (PCK)

In the field of education, teachers’ beliefs are often associated with their pedagogical content knowledge. In order to study teachers’ beliefs, the distinction between teachers’ beliefs and knowledge has to be taken into consideration.

Pedagogical Content Knowledge (PCK) refers to a unique combination of the subject knowledge and associated pedagogical knowledge constructed by the teacher within a certain context. This concept was originally suggested by Lee Shulman (1987). According to him, the key elements of PCK include subject-matter knowledge, general pedagogical knowledge, knowledge of the students, curriculum knowledge, knowledge of the educational contexts and knowledge of the purposes of education (Shulman, 1987). In the present study, the content knowledge refers to teachers’ environmental literacy, relevant pedagogical techniques and their knowledge about the context. To be specific, environmental literacy consists three dimensions (Coppola 1999; Disinger and Roth 1992; Shain, Ertepinar, and Teksoz, 2012, cited from Arnon,Orion & Carmi, 2015): 1) environmental and ecological knowledge (nominal or basic level), which requires familiarity with environmental issues and the means to resolve them, as well as skills to implement these means; 2) positive attitudes and views regarding environmental issues (functional level), which can be understood as personal environmental attitudes, including environmental sensitivity, derived from the values by which the individual lives; and 3) pro-environmental behavior (operational level or willingness for action), which refers to the ability to take personal responsibility for the environment, reflected in active involvement and sustainable behavior. Pedagogical techniques in EE includes different
teaching and learning strategies which can facilitate the students’ learning. Regarding teachers’ knowledge of context contains the knowledge about the student, the school, the local community, etc. It is worth mentioning that within PCK, teachers’ knowledge of curriculum also plays an important role in the learning process. In the context of Tianjin, the curriculum refers to the Chinese National EE curriculum and the National EE Guidelines or other equivalent teaching references books.

It is evident that teacher's subjective knowledge is part of his or her belief system (Op't Eynde, De Corte, & Verschaffel, 2002, cited from Liljedahl, 2008). Because in spite of objective knowledge such as known facts, people develop their own knowledge systems based on their past experiences and internalize them as an essential portion of their knowledge. In this sense, a teacher's subjective knowledge can be viewed as his or her beliefs. However, Mansour’s (2008) study revealed an interactive relationship between knowledge and beliefs. According to Pajares (1992) many scholars shared the same view on these intertwined relationships, besides, they suggest beliefs function as a filter through which information and knowledge can be interpreted into a special form which is compatible to the belief system. This filtration process makes accepted knowledge become a reflection of each individual’s belief. Based on the same logic, teachers’ PCK and their beliefs are linked in the same interactive way. According to Benjamin (2004) beliefs inform teachers’ classroom practice and further, knowledge gained in the classroom or through in service training informs teachers’ beliefs; the teacher knowledge base also informs his or her PCK. Therefore, I argue that teachers’ beliefs can be reflected by his or her PCK.
3.4 Summary of the Theoretical Framework

The purpose of the chapter was to illustrate the theoretical framework of the present study, which aims to understand the curriculum implementation gap through teachers’ beliefs. Key concepts including EE and curriculum are introduced as instruments to support the whole theory. The discussion of teachers’ beliefs have shown its importance in curriculum implementation and in teaching practice. Moreover, teachers’ PCK is concluded as part of their beliefs which becomes a very important focus of this study; however, even though PCK is the focus, the study of teachers’ beliefs are not limited to PCK.
4. METHODOLOGY

The aim of this study is to facilitate the implementation of the EE curriculum by investigating primary school teachers’ beliefs on the teaching practice of environmental education and the application of the national EE curriculum in Tianjin, China. In order to show how the study was carried out, in this chapter methodological issues will be provided. The chapter begins with the research questions followed by the methodological framework which provides the orientation of the research. The description and discussion of the research design includes the context of the study, participants, sampling techniques, and data collection methods and data analysis. The issues of validity and reliability are also discussed in this chapter.

4.1 The Research Questions Leading This Study

Literature review about the implementation gap in China then continues to point out that only few studies have focused on teachers’ beliefs on EE. This study, therefore aims to provide an insight of primary school EE curriculum application gap by investigating teachers’ beliefs on related issues. To guide the study to this aim, questions are asked from teachers’ beliefs on EE itself, teaching learning practice of EE and the application of the EE curriculum respectively. Research questions are:

What are the teachers’ beliefs about EE?

What are their perceptions on the implementation of the EE curriculum?

What role does the EE curriculum play in teaching practice?

4.2 Research Approach

Since the study seeks to explore the beliefs of individual teachers, the study has adopted the qualitative approach. Each individual’s beliefs is constructed from their life experiences and investigating experiences requires an in-depth description of a how or why something has developed. Therefore, a qualitative approach is more suitable for the aim of belief analysis. (Kimaryo, 2011)
Within the qualitative research domain, this study has adopted a phenomenological approach, which can be described as a qualitative research technique that seeks to explicitly describe the implicit structure and meaning of human experience (Sanders, 1982, p. 353). The purpose of the phenomenological study is to reveal the deep meaning behind experiences held by the people who are involved in a particular phenomenon.

Regarding the position of the researcher in phenomenological research, there are two different opinions. Many scholars hold the view that phenomenological research should start from a perspective which is free from hypotheses or preconceptions (Husserl, 1970, cited from Lester, 1999). Only when the researcher puts aside her or his own ideas about the phenomenon is it possible to see the experience from the eyes of the person who has lived the experience. However, according to Lester (1999), more recent humanist and feminist researchers refute the possibility of starting without preconceptions or bias, and emphasize the importance of making clear how interpretations and meanings have been placed on findings, as well as making the researcher visible in the ‘frame’ of the research as an interested and subjective actor rather than a detached and impartial observer (e.g. see Plummer 1983, Stanley & Wise 1993, cited from Lester, 1999). Based on these two opinions, I see both sides of the researchers’ preconceptions. On one hand, the researcher’s preconceptions could affect the process of data collection and reporting. So it is necessary to avoid this interference by bracketing myself intentionally in the stage of data collection and reporting. On the other hand, the researcher’s voice should be heard through his or her interpretation, however, voiced out as reliably as possible.

4.3 Method

With the research method section, the data collection method, data collection process and data analysis are included.

4.3.1 Interview

Interview as the data collection method has been adopted in this study. The reason why interview has been chosen is because interview is suggested as the main method of data collection in phenomenological research (Flood, 2010) because participants’ descriptions can be better explored than any other means by the interaction between the participants and
interviewer. This is essential to serve the purpose of investigating people’s beliefs. Besides, since I as the researcher will interview the participant, this opportunity provides me not only the knowledge of the topics of beliefs and EE but also the research process as a whole.

There are three different types of interviews in general, namely structured interview, semi-structured interview and unstructured interview. In the present research project, semi-structured interview was applied as an instrument to collect data. Semi-structured interview generally follows the interview guide that contains the main themes and topics that need to be covered during the conversation. Meanwhile, the questions are usually open-ended and the participants have the freedom to address the relevant issues. These features allow participants to tell their own stories, in the way they choose, and to express their feeling directly, without the constraints of rigid pre-determined questions. (Rose, 1994)

4.3.2 Data Collection Process and the Participants

Four primary school teachers from two different schools agreed to participate in this study. The selection of the participants is based on the research topic about EE. Since in primary school, EE is integrated mainly in the student daily management and the subjects like Morality and Society, Science, Integrated Practice Activity and local courses (Tianjin and the World). So target participants were expected to have the experience in these areas. Finally, four teachers from two schools were selected. It is worth mentioning that all teachers graduated from teacher schools and have bachelor’s degrees; however, none of the participants have been trained for EE. Interestingly, all of them majored in mathematics education. Participant A became a full-time science teacher in school X. The basic profiles of the participants are listed in the following table. For ethical considerations, they are only referred as participant A, B, C, D and the schools they come from are represented as X and Y.

The two schools chosen are normal public primary schools that are located in different municipal districts and both of them have good reputations within their local school district. The schools, like most of the primary schools, are equipped with their own computer labs and computers, projectors and electronic whiteboards are also included in
the classroom. In school Y, there are about 2500 students and 65 classes, which means the average class size is about 40. Around 200 teaching staff in this school have all received higher education. In School X, there are 3361 students registered and totally 72 classes.

Table 3. Participants Information

<table>
<thead>
<tr>
<th>teacher</th>
<th>Position and experience</th>
<th>school</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Science teacher</td>
<td>X</td>
</tr>
<tr>
<td>B</td>
<td>Head teacher&lt;br&gt;Math teacher&lt;br&gt;Morality and society</td>
<td>Y</td>
</tr>
<tr>
<td>C</td>
<td>Math&lt;br&gt;Tianjin and the World (local course)&lt;br&gt;Head teacher 10 years</td>
<td>Y</td>
</tr>
<tr>
<td>D</td>
<td>Math&lt;br&gt;Tianjin and the World&lt;br&gt;Head teacher 5 years</td>
<td>Y</td>
</tr>
</tbody>
</table>

Before the interviews, participants all had brief communications with the researcher through WeChat, a popular social media in China. In order to clarify the confusion of the participants and construct a comfortable conversation, information about the interview topic, the purpose of the study, the two key documents, the National EE Curriculum and the National EE Guidelines, and the personal profile of the researcher were introduced through WeChat.

The interviews were conducted according to the participants’ schedule and the locations were either in their office or an unoccupied classroom. The pre communication and the free location choice contributed a positive interview. According to Kimaryo (2011), removing the study participants from their natural settings leads to contrived findings, which are out of context. Therefore, the findings can be valid and reliable because the participants were not taken out of their context (Maykut & Morehouse, 1994).
Interview questions are open-ended and designed around three themes, including teachers’ definition and understandings of EE, teachers perceptions about EE teaching practice and the application of EE curriculum (for interview questions see Appendix 1). The interviews are conducted in Chinese. During the interviews, the conversations were mainly about EE, and the participants were encouraged to discuss anything related to the topic of EE. I as a researcher was not seeking for any specific answers to the interview questions, instead, I looked forward their true feelings and beliefs about EE this phenomenon, and more importantly the source where these beliefs derived from. It is argued that the phenomenological method is interested in the ways in which phenomena are experienced, rather than the nature of the phenomena themselves (Cohen et al., 2000, cited from Kimaryo, 2011). Each of the interviews was recorded with the participants’ consensus and transcribed after the interviews and translated into English.

4.3.3 Thematic Analysis

Thematic analysis (TA) is a widely-used qualitative data analysis method which focuses on identifying patterned meaning across a dataset. The reason why this particular method is adopted to the present study is because of its flexibility. As Braun & Clarke (2006) concluded, TA is easy to learn and apply which makes it accessible to novice researchers, results are generally accessible to educated public and more importantly, TA allows social interpretations of data and offers the possibility of generating unanticipated insights. All these features meet the requirements to achieve the aim of this study which is to understand the EE curriculum implementation gap through teachers’ beliefs.

According to Braun and Clarke (2006) there are two ways of identifying the themes, namely inductive way and deductive. The inductive way takes a bottom up approach where the themes are closely linked to the data itself, whereas the deductive approach tends to focus on certain aspects that serve the theoretical needs. This study takes a deductive approach where the themes are oriented by the main research questions.

The analysis followed the six steps suggested by Braun & Clarke (2006)
1. Familiarizing yourself with your data: Transcribing data (if necessary), reading and re-reading the data, noting down initial ideas.
2. Generating initial codes: Coding interesting features of the data in a systematic fashion across the entire data set, collating data relevant to each code.
3. Searching for themes: Collating codes into potential themes, gathering all data relevant to each potential theme.
4. Reviewing themes: Checking if the themes work in relation to the coded extracts (Level 1) and the entire data set (Level 2), generating a thematic ‘map’ of the analysis.
5. Defining and naming themes: Ongoing analysis to refine the specifics of each theme, and the overall story the analysis tells, generating clear definitions and names for each theme.
6. Producing the report: The final opportunity for analysis. Selection of vivid, compelling extract examples, final analysis of selected extracts, relating back of the analysis to the research question and literature, producing a scholarly report of the analysis.

4.3.4 Data Analysis Process

Due to the fact that three main themes are designed within the interview questions, it is better to keep the data themes in line with this design in order to further answer in the research questions. Therefore, taking a deductive approach, transcribed interview data has been categorized into three themes which corresponded with both the research questions and the interview design. The themes are related to teachers’ beliefs on EE, pedagogical practice and the role of curriculum. Under each theme, several sub-themes have been coded after reviewing the data. In the following table, part of the data form participant A is used to demonstrate how the data has been coded and grouped into each of the themes. The interview data from other participants are analyzed through the same process.

Table 4. Data analysis process demonstration

<table>
<thead>
<tr>
<th>Data</th>
<th>Code</th>
<th>Theme</th>
</tr>
</thead>
<tbody>
<tr>
<td>From the school side, what we can do is to cultivate the students habits…..</td>
<td>habits</td>
<td>1) the teachers’</td>
</tr>
</tbody>
</table>
Some of the students have to awareness of taking care of the environment. The activity is to let the students clear the park and the bus stop in this way to raise their environmental awareness.

EE is all about how to teach kind people to do the right things. It (EE) is better integrated in the moral course. It is not only scientific knowledge.

In primary school stage, what we can do for environment protection is very limited.

<table>
<thead>
<tr>
<th>N/A</th>
<th>awareness</th>
<th>understandings and definitions of EE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>moral education</td>
<td></td>
</tr>
<tr>
<td></td>
<td>environment protection</td>
<td></td>
</tr>
<tr>
<td></td>
<td>perfunctoriness</td>
<td></td>
</tr>
</tbody>
</table>

I have to say, we have to adopt multimedia tools in the classroom because for children it is easier to be engaged in the class. Without it, of course we can still teach but the lessons definitely become less interesting.

The role of the teacher has been shifting from a leader to an assistant.

Students don’t think this (environment protection) is a new topic. They can often access the relevant information through reading, watching TV. It is hard for us to attract students with such old topics.

Many students are taken care by their grandparents. They have some old ideas. EE and many other activities are not seen as study business.

Some parents think the competitions can neither help their kids get into a better secondary school nor gain additional scores.

It is hard to teach EE in such a social climate where adults don’t follow the rules.

To cope with this problem (lack of consistency), it should be considered by the education bureau or even take it more serious at the legal dimension.

I prefer to use the reference book because it is more detailed.

| 2) the teaching practices related to EE | teaching methods |
|                                        | teaching content |
|                                        | parents          |
|                                        | influential factors |
|                                        | society          |
|                                        | government       |
|                                        | application       |
|                                        | definition        |
|                                        | challenge         |
|                                        | 3) the role of the National EE curriculum |

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|                                        | influential factors |
|                                        | society          |
|                                        | government       |
|                                        | application       |
|                                        | definition        |
|                                        | challenge         |
|                                        | 3) the role of the National EE curriculum |
4.4 Validity, Reliability and Ethical Concerns

In the evaluation of a research project, reliability and validity are often used to judge the effectiveness of a research project. In a broad sense, validity refers to degree to which the instrument used has measured what it was intended to measure, and reliability means the consistency within the employed analytical procedures (Noble & Smith, 2015). In qualitative research, reliability and validity are conceptualized as trustworthiness, rigor and quality (Golafshani, 2003).

In the present study, the following measures have been taken to ensure the validity and reliability. First, as one of the important purposes of phenomenological approach is to explore the participants’ lived experience, I as the researcher have intentionally bracketed myself in order to catch the true description from the people who are involved in the phenomena. Second, the semi-structured interview provides the opportunity for the participants to freely address the topics which they think are relevant to the study. This again increased the reliability of the study. Third, strategic measures have been taken to create natural and comfortable interview climates, such as pre communication and careful selection of the interview location. Last, interviews have been audio recorded. This provides the true content of the participants’ descriptions and also allows the researcher revisit and avoid the misinterpretation of the transcripts.

Ethics can be defined as a method, procedure, or perspective for deciding how to act and for analyzing complex problems and issues (Resnik, 2015). According to Fouka & Mantzorou (2011) the major ethical issues in conducting research are: a) Informed consent, b) Beneficence -Do not harm c) Respect for anonymity and confidentiality d) Respect for privacy. Regarding the present study, ethical issues are considered from two aspects which are informed consent and confidentiality.

Regarding to consent, as mentioned in the data collection process, all the participants are informed about the interview procedures and topics and the fact that the interview would be audio recorded. All four participants agreed to participate in the interview with all the knowledge mentioned above. For confidential consideration, all the participants’ names and the school names are replaced by letters. As for privacy, no such issues were
discussed; and regarding beneficence, my research work did not harm the participants in any way.
5. FINDINGS

The findings are presented around three themes which correspond to the three research questions. The themes are 1) the teachers’ understandings and definitions of EE, 2) the teaching practices related to EE, and 3) the role of the National EE Curriculum in the delivery of EE content.

5.1 Theme 1 Beliefs on the Nature of EE in the Context of Tianjin

The first research question focuses on the teachers’ beliefs about EE. Recall the objectives stated in the National EE curriculum:

Grade 1-3:
Approach nature, draw close to nature and learn to appreciate it. Learn about the relationships between nature and daily life and get to know the first, easy rules of environmental protection.

Grade 4-6:
Learn about the environmental problems in the community and school area. Study the relationship between human actions and the state of the environment. Adopt environmentally friendly behavior.

It is important to look at this theme together with the primary level objectives in order to identify the implementation gap. Under this theme five interpretations of EE have been identified, including *environmental protection, habits cultivation, environmental awareness enhancement, moral education* and *perfunctoriness*.

5.1.1 EE as Environment Protection

At this level, teachers describe EE as a way to teach students how to protect and take care of the environment. In these cases, “environment” primarily refers to the local community. The reason teachers perceive EE as environment protection is because the learning content at school related to environmental studies is mostly centered on environment protection. Activities such as garbage sorting, recycling, and local community cleaning ranks at the
top of the school’s activities among many primary schools according to the participants’ knowledge. When asked how much Science related to EE, participant A responded,

“In the science classroom, there are environment protection posters. In the second semester of Grade 3, recycling is included in the textbook. Environment protection knowledge are integrated more in the high grades.” (Participant A)

Similarly participant B gave a comment on EE,

"One of the benefits of EE for the students is to let them realize the importance of environment protection and make the environment better for their generation."  
(Participant B)

As mentioned in the curriculum, 'easy rules' of environment protection should be addressed. From this perspective, teachers’ beliefs match the objective according to the National EE Curriculum.

5.1.2 EE as a Process of Habits Cultivation

EE is understood as a way to cultivate students’ habits by influencing their daily lives. In this sense, EE attempts to change students’ behavior through various activities and some daily routines in the school, such as being conservative of the natural resources and sorting garbage.

Participant B believes that young children's habits are relatively easy to formulate and therefore, teachers should hold this critical period in the students’ lives to support positive habits development.

“It is easy for a child to formulate a habit, as long as s/he persist in doing one thing s/he will probably keep on doing it in the future.” (Participant B)

His idea about habit cultivation perfectly matches Confucius enlightenment ‘Men are close to one another by nature. It is the influence of environment that sets them wide apart.’
(Yang, 1980, cited from Wang, 2004). 'If habit is cultivated when one is young it becomes like one's own nature, habit is then second nature.' (Wang, 1991, p. 61, cited from Wang, 2004).

Participant A shares the same belief with Participant B on habits cultivation. However, he provided a different reason for this view. He believes students at this age are not able to master high level environmental knowledge or skills or make concrete contributions to the environment. So the aim of EE should focus on positive habits cultivation in young children rather than trying to pass on lecturing knowledge from the textbook or curriculum. Both of the teachers formed their belief base on their basic understanding about their students.

Relating to the curriculum objectives, cultivating positive habits towards the environment can be seen as the process of teaching students to adopt environmentally-friendly behavior. Therefore, this belief is also in line with the National EE Curriculum.

5.1.3 EE as a Way to Raise Environmental Awareness

The interpretation of EE has another level, where the aim of EE is to raise the students’ environmental awareness. To be more specific, teachers can use different methods to provide students with a greater awareness of their surrounding environment. For example, Participant B believes that taking students to beautiful places with flowers, trees, and fresh air can help them realize how beautiful the nature can be and make them realize the environmental problems faced in cities. This follows the logic that people usually tend to make contributions to the environment when they are aware of environmental degradation.

So, raising awareness of current and future environmental issues is another common theme that the participants discussed during this part of the interview.

Following the same logic of the previous understanding about EE as habit cultivation, Participant A thinks young kids cannot do much concrete work for the environment due to their limited abilities, so to raise their awareness becomes an achievable goal with primary school aged students.
“To the primary students, environment protection is mainly about the experiences and what is truly important at this age is to internalize this experience and become environmentally aware.” (Participant A)

In a word, interpreting EE as a way of raising environmental awareness echoes the objective of “draw close to nature and learn to appreciate it.”

5.1 4 EE as Moral Education

In the discussion of Environmental Education, all four participants believe the moral emphasis cannot be ignored. In other words, EE not only contains environmental knowledge, habits cultivation and environmental awareness enhancement but also students’ ethical development. This interpretation can be explained according to the interview from three aspects. First, in Tianjin and many other cities, all the school activities related to EE are responsible by the moral education office. The job division within the school administration implies EE is a part of moral education. Second, in the Morality and Society textbook contains many topics related to EE such as industrial pollution, acid rain, air pollution and public behavior. This fact gives a strong confirmation of the ethical nature in EE. The last explanation is the one derived from a participant’s personal views. Participant A expressed his understanding as “EE is all about how to teach kind people to do the right things.”

5.1.5 EE as a “Show”

The other point of view about EE from the participants is that EE is only a show, an empty shell with a fancy outside but not much meaningful content inside. Participant C explained this phenomenon based on her knowledge and observation through her years of experiences. First, since EE has been greatly integrated into moral education in primary school, the quality of moral education and the attention paid to moral education has become crucial to the success of EE. The quality of moral education from the moral education office at some level can represent the quality of EE in the school. Unfortunately, in school Y, where Participant C works, moral education is not taken seriously. In fact, the teacher who is in charge of the moral education office got the job by pulling personal relations in the education bureau not because of her qualifications. Participant C continues
by stating that “most of her speeches are downloaded from the Internet, it does not fit the school context. She was my sister schoolmate. She got the job because she knows people in the education bureau.”

Second, the EE related school activities has shown very low quality. As mentioned before, Integrated Practice Activity is one course often related to environmental content and issues. In the case of school Y, every year the students are taken to the same place called Yangliuqing Zhuangyuan, where they can visit the farm and participate in some outdoor activities. For the convenience of the organization, this activity has been repeated through six years. Not only have the students lost their interest in the activity, the teachers have also found it boring and not educationally valuable.

The third reason is the target subjects being incorporated with EE, which Participant C refers to as “small subjects”, are not given adequate time or quality of instruction. In many schools, like school Y, there are no full time teachers for these subjects. Usually, these subjects are covered by other core subject teachers who often put the core subject in priority. Most of the time, teachers use the structured time for the EE incorporated subject as an extension or an exercise section for the core subject. The situation changes only when there are inspections going on.

“Small subjects are usually covered by the other teachers. For example, math teachers cover the Morality and Society course. If there is no inspection, teachers teach math instead. The small courses are often not delivered. When I taught the topic for example “my hometown”, I show the students the documentary “A Bite of China”, which is related to the topic, because I don’t know how to teach this topic. Students can also learn by watching educative videos. Some teachers just play some entertainment show on the small subject lessons” (Participant C)

Participant D is also from School Y and provided the same view as Participant C, which states EE is a perfunctory task in the school. However, his belief derives from a broader context related to the hierarchical social system.
“I feel the whole thing (EE) is just a perfunctory project within which the contribution from us, the common people, is very little. The government should take a top down approach and work together with the social public, otherwise we cannot do much.” (Participant D)

This last interpretation of EE indicates a very strong negative attitude of the teachers’. Compared to the previous four beliefs about EE, this one is not related to EE itself, instead, it gives another perspective and provides some hidden facts and values existing within the system.

5.2 Theme 2 Pedagogical Practice

The second theme, pedagogical practice, is identified based on the second research question which is to discover the EE teaching and learning practices. With this main theme, findings are presented from three aspects which are related to teaching content, teaching method and key influential factors of the teaching practice.

5.2.1 Teaching Content

Since EE is conducted as a cross-curricular topic integrated into different subjects, environmental elements are intertwined with the primary subject. It is hard for the teachers to isolate EE from the main subject and describe, in detail, why EE is such an important topic to be learned in school. However, one highlighting point that teachers have shared in common is the importance of content contextualization. During their classes, teachers prefer to use cases or phenomena that are close to students’ life. They find in this way students can be emotionally touched and better engaged in the class, and issues related to the environment often have this kind of close, personal relevance. One of the most commonly-used topics is the severe air pollution occurring in major Chinese cities, especially in Beijing and Tianjin areas.

“In the textbook (Morality and Society), it is mentioned about industrial pollution and acid rain, but it is far from the children’s lives. In the city, the most close life example is the air pollution which the student can see, can feel and breathe…..” (Participant B)
Regarding the same issue, participant A provides an example of a migrant children's school where the students are mostly from low socioeconomic families.

“There is a migrant school close to my home, very often I can hear the moral teacher give speeches through the speaker telling the student to wash their necks every day. Different schools feature differently. EE should be designed to fit particular conditions of each school.” (Participant A)

This belief about contextualization again echoes the objectives from the National EE curriculum which is illustrated in section 5.1.

The other concern regarding teaching content is a challenge brought by the nature of EE. Unlike Science and Mathematics, EE is not only covered by formal education but also through many public information channels. Students can obtain information from the TV, internet, parents and other sources. For example, saving water is very often used as an educational theme in primary schools; however, because so much information on water conservation reaches students through so many other channels, the topic often loses its influence in the classroom as students are tired of hearing about it. This puts teachers and curriculum developers in a very difficult situation because they have to carefully design or re-design an interesting class based on an all-too-familiar topic. Participant A said,

“Students don’t think this (environment protection) is a new topic. They can often access the relevant information through reading, watching TV...... it is hard for us to attract students with such old topics.” (Participant A)

5.2.2 Teaching Methods

There is evidence showing that teachers are in an urgent need of effective and fresh teaching methods regarding EE. This problem is caused by two reasons. As participant A pointed out, topics related to EE require a student-centered learning environment, where the leading role of the teacher changes into a facilitator or a supporter. Therefore, teaching methods for traditional teacher-centered classroom are not quite as effective as a learning
environment in which students are taking a more active, personal role in their education. The other challenge resulting in this need of fresh teaching methods is brought by social media. With the easy access to various social media, for example internet, smart phones and TV programs, students have gotten familiar with most of the environmental topics and accumulated certain amount of relevant knowledge before they enter the class. Thus, to motivate the students requires new pedagogical methods.

The other pedagogical concern is that EE is lacking consistency. Participant C pointed out that the EE related school activities carried out within the Integrated Practice Activity only once a semester. It is hard to generate positive results in such an inconsistent form. Chinese experts in the field have already pointed out this problematic pedagogical issue, according to Wasmer (2005), the fact that activities only happen once a year does not contribute to raising environmental awareness, in addition, they suggest that regular activities at best are those made up by the students themselves. The activities organized by officials or teachers are not sustainable because they lack coherence and follow-up care.

Participant A gives a broader view related to the consistency of EE. When he was asked about the challenges of teaching EE, he claimed that currently there is no cooperation between primary school and secondary school teachers. Many students have built great interests in certain areas under the help of primary school teachers, but they usually lose the support when they move up into the secondary schools because the secondary teachers cannot access each student’s academic background of areas which are invisible from the examination scores.

Teaching according to the textbook was mentioned by Participant B, when he was asked about how he taught EE related topics in Morality and Society. This can count as one of the most traditional ways of teaching.

“I am teaching according to the textbook. I would talk more on the topics that I am familiar with. The most frequently mentioned topic is the haze in Tianjin.”  
(Participant B)
The other commonly applied method is the usage of technology. Both of these two schools are equipped with computer labs and computers, projectors and electronic whiteboard in the classrooms. Also, teachers often apply multimedia tools to attract the students.

“I have to say, we have to adopt multimedia tools in the classroom because it is easier to engage the children in the class. Without it, of course we can still teach but the lessons definitely become less interesting.” (Participant A)

5.2.3 Parents' Role in EE

China is very much a society in which family is seen as the center of an individual’s life, and this cultural norm is such an integral and influential factor in a child’s education. During the interviews, most of the participants highlighted the family influence on the students’ education. As mentioned before, the extra-curricular activities and educational competitions are a large part of teaching EE, but students are not able to participate without parents' support financially and intellectually. According to participant D, many parents still see mathematics and Chinese language as the core and other subjects as less important. Some parents even claim that those extra-curricular activities are a waste of time, and the fee for participation is just a way for the school to earn extra money. Similarly, Participant A and C have noticed the utilitarianism value among the parents and these values inevitably influence their children. If the extra courses provide great environmental knowledge but do not offer some kind of reward, certificate or additional academic grade, then it is difficult for parents and students to understand the educational value. It is unfortunate for the implementation of EE that the value of certain activities are being ignored because, in the minds of many parents, they do not measure up to the core subjects, do not result in higher grades, and therefore seem unimportant.

“Only few students participate the creativity competition. It depends on how much the parents can help their kids. The kids are too young, adult's help is necessary. Nowadays, students are not very passionate about these kind of activities, because their performance in the competition cannot be the reference for “three good student” or added to their final grades any more. Parents value the certificate very much.” (Participant C)
There are also positive cases in which parents are being very supportive. For example, one parent from School X according to Participant A used his personal connections to set up educational tours for his kid and the classmates. Very good feedback have received from the students after the tour.

5.2.4 EE as a Lifestyle

The other influential factor is identified as the social environment, as the effectiveness of EE is best analyzed by looking at people’s real-life environmental choices, concerns, and actions. Participant A said, “it is very difficult for us to teach the students how to behave with such a social environment where adults do not behave themselves.” Again, this is another difficult part of teaching EE; people, regardless of age, have a difficult time truly caring enough to change their lifestyle. EE is not simply a content subject that can be taught from a book and used to apply to a new problem, such as topics covered in Mathematics, Science, Language, and History; EE bring with it an entire new way of thinking and acting, especially with the words “sustainability” and “sustainable development” becoming such important environmental buzzwords over the past decade or so. People realize that making conscious lifestyle choices to help the environment is probably the best thing to do for our society, but there is quite a gap between the knowledge of doing the right thing and actually committing to doing it. This is one of the biggest problems that the participants identified as part of the social influences of EE in the classroom.

5.2.5 Governmental Intervention

The last influential factor brought up by the participants is the governmental intervention. Teachers are asked about the support they require for effective teaching of EE. Both participant A and D believed government intervention is necessary in order to make achievements in this field. Participant D believes the government should take a top-down approach towards EE policy. Participant A has expressed a similar idea,
“To cope with this problem (lack of consistency), it should be considered by the education bureau or even take it more serious at the legal dimension.” (Participant A)

The findings in this section pointed three influential factors which are related to family, society and government. All these beliefs are generated from the teachers’ experiences within system or the social context.

5.3 Theme 3 Curriculum Application

The third theme is related to the third research question and attempts to explore the role of the National EE curriculum in teaching and learning practice. The results are presented from the application of the curriculum and challenges of the application. Given the fact that teachers were not familiar with this document, findings in this section is more focused on their general understanding of the National EE Curriculum.

5.3.1 The Role of the Curriculum

Among Chinese teachers, there is a general understanding of curriculum as a framework within which learning and teaching activities are carried out. From the participants’ descriptions, a common element is the authoritative nature of the curriculum. Participants A gave a very vivid simile, “the curriculum is like a door frame, we need to watch out when we get through. Nobody wants to hurt himself.” Similarly, Participant C described the curriculum as a framework.

In addition, the curriculum also serves as a standard benchmark according to which teachers can reflect on their lessons and evaluate the students. The other interpretation described curriculum as a theoretical source. It is very often used during the process of teacher evaluation or a job interview that requires a lesson interpretation. According to Participant B,

In my whole teaching career, have used curriculum twice. One is when I was a teacher student, curriculum was part of my exam content. The other time was when I gave a lesson interpretation for a course evaluation. (Participant B)
The finding indicates that in the daily teaching practice, the curriculum is barely used. The challenges leading to this problematic situation are also evident from the interviews. First of all, the curriculum is too broad to provide any concrete guidance for the teachers' teaching. Relating to the situation that has been described in the section 5.2.1, the urgent need of fresh content and new teaching methods are not addressed in the curriculum. Second, because of this broad nature, to apply the curriculum in practice requires the teachers’ further interpretation and therefore consumes a great amount of time. Third, it is believed that the curricular goals are more associated with textbook publishers rather than with the interests of the students and teachers in the classrooms.

“After reading this document (the National EE curriculum), I don’t feel inspired or guided. I wish there are successful teaching cases that I can borrow for my own class. I believe it is not just me, most of the teachers would not read the curriculum. Usually we teach based on our own experiences or by consulting colleagues. It takes too much time for me to associate the broad content to my lesson plan.”

( Participant A)

5.4 Summary of the Findings

In the first theme, teachers have shown their understanding of EE which is perceived as environmental protection, habits cultivation, a way of raising awareness and moral education and a perfunctory task. The first four interpretations indicate that teachers have the basic understanding of EE, which is generally in line with the objectives mentioned in the EE National curriculum. The last interpretation refers EE as a perfunctory task which implies a negative attitude among the teachers, more importantly, the marginal status of EE has been identified by this study.

In the second theme, insufficient teaching methods and lack of fresh pedagogical content are the main findings which is explicitly shown from the data. In addition, family as an external factor significantly influences the EE learning process from both positive and negative ways. Moreover, the demand for governmental intervention needs to be further discussed.
In the last theme, curriculum according to the participants functions as a framework and serves the theoretical demand, but it is very challenging to apply in practice. Because the National EE Curriculum has failed to address the teachers’ pedagogical needs such as detailed instructions, new teaching methods and fresh pedagogical content.

Since the study has focused on teachers beliefs, the sources from which the beliefs derived from have to be taken into consideration. The above mentioned main findings are all derived from common sources like the school system, teachers’ daily teaching experiences and the social context, all of which are highly relevant thinking of a good implementation of EE in China.
6. DISCUSSION AND IMPLICATIONS

In this chapter, research findings are discussed aiming towards the main purpose this study which is to understand the implementation gap of the EE national curriculum. According to the results presented in the previous chapter, the constraints of hindering the implementation of the EE national Curriculum can be concluded from two aspects, which are the marginal status of EE and the insufficient PCK of the teachers.

6.1 Insufficient PCK

In the National EE Curriculum and the EE Guidelines contain topics which should be taught in different levels and with appropriate goals of the teaching activity. However, the content and activity suggestions only provides very limited topics and very general suggestions. There is also overlapping topics between different grade levels. Therefore, the application of the curriculum requires additional support in terms of rich content and variety teaching methods. These requirements have extremely challenged the teachers’ PCK.

The findings generated from theme 1 reflected the teachers' understanding of the concept of EE and learning objectives of EE. Teachers’ beliefs about EE itself as environmental protection, positive habit cultivation, moral education and environmental awareness enhancement are basically in line with the learning objectives from the national curriculum. However, the interpretation of EE as a “Show” implied the negative attitude of the teachers'. As the definition of environmental literacy mentioned in section 3.2.5, positive attitudes consist one of the important dimensions of environmental literacy. In this sense, teachers’ negative attitudes can be considered as an indicator of low environmental literacy.

In theme 2, strong evidence has shown that the teachers are in an urgent need of pedagogical methods and contents. Similarly, Wasmer’s (2005) analysis of Chinese environmental education has identified the same needs of schools in big cities.

The reason why the teachers encountered insufficient teaching methods is caused by the change of teachers’ role in teaching EE, as Participants A pointed out that teaching EE
requires a student-centered approach rather than lecturing. Moon (2008, cite from Kimaryo, 2011, p.41) confirms that students can learn better through active and participatory ways in real life situations. However, this vision tends to conflict with the contemporary teaching practice in China. First of all, applying student-centered teaching methods is time-consuming in terms of both preparation and conducting the lessons. Since Chinese teachers do not have the history of applying modern student-centered teaching methods, in order to do so it requires teacher to devote great efforts on self-learning and material collection. This fact with no doubt will add burden on their heavy workload that they already have. From the perspective of teaching process itself, student-centered methods are more suitable for small class size, however, just like most of the Chinese city primary schools, the class size in the two target schools are about 40. Thus, to better control the teaching pace and meet the teaching schedule, the traditional teacher-centered teaching is preferred. Besides, in China there is no tradition to employ teaching assistant, therefore taking student-centered teaching approach seems in teachers' minds not practical in this circumstance.

In Wang’s (2011) work on applying student-centered teaching methods in Chinese rural areas, one reason of teachers refusing student-centered methods has been pointed out and it also fits the city context, which is the anxiety of being blamed by making mistakes of applying the new methods.

In addition to insufficient teaching methods, the lack of knowledge of the national curriculum is also evident in the findings. Since EE is a cross curricular theme and not an independent subject, teachers tend to pay more attention on the curriculum of the subject they teach.

6.2 The Marginal Status of EE

The other main cause of the implementation gap can be concluded as unequal attention paid on different subject matters. In China, there is the long history of the “subject discrimination”. From the findings, reasons can be identified from three aspects including the utilitarian idea, hidden curriculum embedded in the institutional context and the belief in top-down approach.
The utilitarian idea is very common among Chinese parents. Education has been seen as the most effective way to promote social mobility. So any educational activities directly or indirectly serve this aim drawing a lot of attention from the parents. At primary school level, the utilitarian value can usually be reflected from the appreciation of high examination scores, rewards from activities or the honor of being “three-good” student. However, EE can hardly contribute to these goals. Consequently, less support is received from the parents and what even worse is that parents’ utilitarian values can be easily passed to their kids. This fact creates a big challenge to the promotion of EE in primary schools.

Another factor that pushes EE to the marginal situation is the unhealthy institutional climate which has been identified from the data. As concluded in the end of the findings, the belief of EE as a perfunctory task is produced by the school system where some teachers did not give full support to the promotion of EE and the effects can be extended to more teaching staff. More importantly, the teachers’ attitudes towards the so called small subjects implicitly constructed a social environment which is according to Zhang (2009), an essential part of the hidden curriculum and its impact on students’ values perspective and view of life is far-reaching and unforgettable.

The last point needs to be discuss in this section is the teachers’ belief in the power of the top-down approach of education reform. From the policy level, though the government is promoting EE in different channels, the evaluation and inspection seems week. Without evaluation and inspection, the so called small subject matters can be easily replaced by the content according to the teachers’ wish (section 5.1.5). Thus, the loose inspection makes the teachers feel the government is not fully committed to the environmental issues.

6.3 Implications for Effective EE Implementation

The implementation gap is caused mainly by two reasons as concluded in the previous section. Corresponding to the two reasons, several implications will be discussed relating to teaching training, educative curriculum, parents education and the legalization of EE.
The study shows (section 6.2) that the implementation gap is generated by the fact that the level of teachers' PCK does not meet the requirements of the intended curriculum. To cope with this problem, measures can be taken for both ends. From the teachers’ side, it is obvious that pre and in-service trainings are in demand. Wasmer (2005) has offered two suggestions for big city primary schools: 1) ‘case study’ textbooks to give the teachers new ideas; 2) training with experts from other countries to share experience and develop new approaches to pedagogies.

Moving to the other end, improvement can also be achieved by a better curriculum design. EE in China comparing to many other countries is relatively new. There is a lot of new knowledge for the teacher to learn in terms of subject matters and pedagogical matters. In the reviewing of the definition of curriculum, one common idea shared by the scholars is that the student is the target of the learning process. This fact has put teacher in a peripheral situation within the learning process. Therefore, including teachers’ learning interest in the curriculum is as important as the students’. Based on Ball and Cohen (1996), the curriculum materials designed to address teacher learning as well as student learning is called educative curriculum (cited from Schneider, Krajcik, and Marx, 2013). In the study of educative curriculum material on science education conducted by Schneider, Krajcik, and Marx (2013), positive effects on teacher learning were recognized. Further research on educative curriculum material development could be a new focus in the field EE in China.

To mediate the implementation gap, improving the status of EE is fundamental. Regarding to parents, they are always a crucial factor in students’ education. Even though interfering family education is so far beyond the capability of the current formal educational system, transmitting educative information and positive environmental value to the parents could be included as one of the teaching goals.

Considering EE in the hierarchical social context in China, strengthening the curriculum and policy implementation supervision is quite important. Some scholars even suggest to accelerate the legislation process of environmental education law (Wang & Tian, 2015).

The critical factor in the marginalization of EE is the agency of teachers, because they are the soul of the teaching practice. However, the negative attitude appeared within the
system has created such a dilemma where what we are trying to change, namely the teachers’ beliefs, is generated from the system itself.
7. REFERENCES


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Appendix 1.

Interview Questions

Theme 1

1. Do you think EE is necessary in elementary school? Why?
2. Could you please talk about your understanding of EE? What is EE?
3. What are the features of EE, compared to other subjects?
4. What are the goals of EE?

Theme 2

1. What teaching materials have been applied in your class to support the content related to EE?
2. What are the ideal teaching methods of EE? What is the reality?
3. In your opinion, what role should the teacher play in EE, in order to achieve satisfactory learning outcome?
4. To reach the goals of EE, what are the key elements needed in terms of teaching material, human resource, administrative support or any other things in your mind?
5. Could you please talk about the challenges that you have encountered in EE teaching? Did you receive any support from the school or stakeholders?

Theme 3

1. What are the functions of a curriculum in teaching practice? Do you think the application of the EE national curriculum could bring impacts on your teaching? Why?