

Review of Environmental Education in Chinese Primary and Secondary Schools in Recent Twenty Years - A Case Study of Shenzhen

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ABSTRACT

Since the First National Environmental Protection Conference was held in 1973, environmental education in China has developed rapidly, and Shenzhen is one of the fastest growing areas. This paper takes Shenzhen as an example to study the frontier of environmental education practice in China. This paper summarizes the characteristics and trends of environmental education development in Shenzhen in the past 20 years. It is found that the construction of environmental education system in Shenzhen is mainly carried out by education place, school curriculum and educational activity. In terms of education place, Shenzhen has established an education place system with green schools as the core and environmental education bases and natural schools as the auxiliary. In terms of school curriculum, Shenzhen's teaching model is mainly based on permeate curriculum, supplemented by isolate curriculum. In terms of educational activity, the primary school stage is rich in activities. Although activities have decreased at the middle school stage, the depth of knowledge taught has increased.

Keywords : *Environmental Education Development; China; Primary Schools; Middle Schools*

1. INTRODUCTION

Since 1972, the Declaration on the Human Environment which was issued in the United Nations Conference on the Human Environment put forward "Education in environmental matters, for the younger generation as well as adults, giving due consideration to the underprivileged", and environmental education has gradually received the attention of international countries including China. The next year, China held its first national conference on environmental protection. Five years later, China's State Council proposed for the first time that environmental protection should be included in primary and secondary school curricula in its *Report on Environmental Protection*. Since then, Environmental education in China has been in a stage of exploration and development. Due to the uneven development among regions, environmental education in some regions is often one step ahead of the national level. Guangdong, as a developed region, has taken the lead in environmental education in China at the end of the 20th century.

Since the 1970s, some schools in Guangdong province have added environmental protection to their teaching [1]. By 2001, according to the statistics of the Center for Environmental Education & Communications Under the State Environmental Protection Administration (SEPA), the total number of "green schools" in Guangdong province was 529, ranking first in China [2]. Guangdong's "green school" standards have also become national standards [1].

As a developed area in Guangdong province, Shenzhen has developed rapidly in environmental education since the "National Green School Commendation Conference" was held in November 2000 [2]. After 20 years of development, Shenzhen's environmental education has made a lot of achievements, but there are still some shortcomings. The purpose of this paper is to explore how environmental education in primary and secondary schools in Shenzhen has been developed in the past 20 years, and to briefly discuss its changes and development in order to have a simple understanding of the advanced level of environmental education in primary and secondary schools in China.

2. ENVIRONMENTAL EDUCATION IN SHENZHEN

As a developed region in Guangdong Province and adjacent to international business centers such as Hong Kong, Shenzhen has unique advantages in the development of environmental education. Since 2000, Shenzhen has gradually led the nation in many aspects of environmental education, especially in primary and secondary schools. In 2006, the number of schools offering courses related to environmental education in Shenzhen reached 100% [3]. In 2010, Nanshan District of Shenzhen established China's first "National Environmental Education Experimental Area" [4]; in the same year, 8 primary schools in Shenzhen were awarded "International Ecological Schools" by The Foundation for International Environmental Education (FEE) [5]. In 2014, the first nature school in China was established in Shenzhen.

In the last two decades, the construction of environmental education system in Shenzhen is mainly carried out in three aspects, namely education place, school curriculum and education activity, which will be expounded respectively.

2.1. Education Places

2.1.1. Green Schools

In China, "green schools" originated from the National Action Program for Environmental Publicity and Education promulgated by the government in 1996 [6]. On the basis of realizing its basic educational functions, green school is guided by the idea of sustainable development, incorporates environmentally beneficial management measures into the overall daily management, and makes full use of all resources and opportunities inside and outside the school to comprehensively improve the environmental literacy of teachers and students.

Green schools have been attached great importance by Shenzhen government and are developing rapidly in Shenzhen. In 1998, green schools started to be established in Shenzhen [7]. In the first "National Green Schools Commendation Conference" held in November 2000 in Shenzhen, two schools in Shenzhen were commended, equal to the number of schools in some provinces [8]. In 2001, the Shenzhen government proposed "By 2005, more than 80% of the city's schools and kindergartens will carry out activities to create 'green schools (kindergartens)'" [9]. On January 8, 2009, Shenzhen Government issued "Evaluation Standards of Shenzhen Green Schools (Primary Schools)" and "Shenzhen Green Schools (Middle Schools)" to evaluate green schools.

After the problem of "popularizing green schools" was solved, the quality of green schools, which had been in a secondary position, naturally became the top priority in the construction of green schools. Nowadays, the construction of green schools is still proceeding methodically. What is different is that the standards of green schools have become more stringent. In 2021, Shenzhen issued the new "Green School Evaluation Standard" to replace the previous "Shenzhen Green School Evaluation Standard". The new policy has further refined the assessment content and corresponding points, and made more specific requirements on the evaluation content. In a sense, this can be seen as a change from quantity to quality in the construction of green schools in Shenzhen.

The construction of green schools contributes to environmental education in many aspects. For example, Green School Evaluation Standards include "having green student clubs", "having environment-friendly school-based textbooks" and "having lectures on environmental protection" as evaluation bases. Moreover, as a kind of teaching place with high green area, permanent environmental protection slogan and environmental protection education bulletin board, green school is considered to have the function of potential course. Yang Xiaohui [10] found that campus environment construction and other factors play important roles in the cultivation of environmental awareness of senior high school students in green schools. Although green schools have played a positive role in environmental education, they still have many shortcomings, such as superficial environmental education lessons and amateur teacher of environmental education.

All in all, green schools are the core of the whole environmental education system in Shenzhen. The courses and activities of environmental education can be designed based on green schools, and they can also be implemented through the cooperation of education bases and nature schools with green schools.

2.1.2. Environmental Education Bases

According to the definition from Shenzhen government, environmental education base (EEB) refers to the place or the institution that has characteristic resources of environmental education, supporting facilities, equipment and personnel to carry out ecological environmental education activities, and provides ecological environmental education and publicity services to the public through effective measures of ecological protection, environmental governance or environmental management.

The first "environmental education base" in Shenzhen, Evergreen Resort, was selected in 1998, and then the

number of EEB has been increasing since then. By 2021, there are 36 EEBs in Shenzhen [11].

Shenzhen's requirement for EEB education function is relatively low. The EEB acceptance requirements declared by the Human Settlements and Environment Commission of Shenzhen Municipality in 2014 only required EEB in the future to open to the society, especially to the school on a regular basis, and the application form only needed to explain the number of narrator, environmental teacher and environmental protection activities held before. In 2021, on the basis of the original application conditions, *The Standards for Evaluation of Environmental Education Bases* were also published as the basis for self-evaluation, which requires EEB must meet the following requirements: EEB should have exhibition hall, function room and other places to carry out environment education campaign; narrators in EEB should accept professional training before taking up their jobs and regularly accept more than professional skills appraisal; at least one set of written or image publicity of environmental education must be combined with school courses, and at least two public welfare environmental education practice activities are held for students every year, but there is no specific requirement on the score of the declared EEB in the government notice.

Generally, in primary and secondary schools, EEBs mainly rely on schools to organize students to go to the nearest base to carry out environmental education, and its frequency and quality are not stable. In terms of education methods, EEB mainly carries out environmental education for students by displaying publicity materials and explaining by staff members [12]. Based on the EEB has a rich variety of facilities and materials, in Shenzhen's environmental education system, it has been a strong complement to the green school.

Although the EEB has many advantages, it still has the following problems:

1. The development of EEBs is restricted by exam-oriented education, and children's free time and space are squeezed by heavy learning tasks; Schools are also gradually reducing the frequency of students to visiting EEBs for safety reasons.

2. The EEBs pay too much attention to economic interests, the environmental education quality of the staff is not enough, most of the staff lack professional learning opportunities, focus on promoting products or praising the image of the base, and hence cannot provide high-quality interpretation or environmental education services.

3. Lack of professional talents. Some EEBs are having trouble recruiting the right people.

4. The form of educational activities is single, mostly indoctrination type, the content is outdated. [12][13]

2.1.3. Natural Schools

Natural school is an outdoor public location which is based on public infrastructure like natural reserve or botanical garden. It carries science and education functions and serves students of K12 and adult citizens [14]. Due to this kind of places do not have a uniform name, Chinese researchers called it collectively as "Natural school" [15]. Since the first nature school in China, OCT Wetland Nature School, was established in Shenzhen in 2014, 17 nature schools have been established in Shenzhen by the end of this paper [11].

Nature school is regarded as an expansion and enhancement of EEB in content and function [16]. In terms of school applying, nature schools are required to have a typical physical geography area or a representative natural ecosystem area, full-time and part-time administrators and volunteer teachers, characteristic textbooks of natural schools compiled and printed in combination with schools' characteristics, special classrooms, and provide teaching and experience close to nature. In terms of teaching methods, natural schools can provide more effective environmental education than environmental education bases by relying on their own textbooks, classrooms and professional teachers.

Take the first nature schools in Shenzhen, OCT wetland park, as an example, on the basis of the exhibition hall of ecological education, the Wetland Park has established an exhibition team of ecological and environmental education through cooperation with the Hua Foundation, strengthened the selection quality of management personnel and education personnel, and built an environmental education platform through digital means [17].

Due to the nature schools are more professional than EEBs on teaching, in recent years, many original EEBs are gradually changing into natural schools, for example, the OCT Wetland Park mentioned above was a member of the EEBs before it became a nature school, perhaps natural schools are gradually replacing the function of EEBs in the future.

2.2. Curriculum Designing

2.2.1. Permeate Curriculum

In China's education system, the sixth grade is a watershed. Before grade six, the school's curriculum arrangement is relatively diversified, with music, drawing, physical education and other non-college entrance examination subjects accounting for a large number. However, after graduating from primary school, the student will face two major recruitment exam (Senior High School Entrance Examination and National College Entrance Examination), so teaching in the class is directly linked to examination. From the traditional perspective,

environmental education, as a kind of comprehensive subject not included in the examination system, is often not valued in educational practice. However, the education departments of government often have requirements on environmental education.

Shenzhen, like other parts of China, also has the characteristics mentioned above in education. Faced with a conflict between environmental education and enrollment rates, teachers in Shenzhen are trying to balance the scales. In order to promote environmental education for primary and middle school students without reducing the number of other courses, many teachers have explored ways to combine environmental education with traditional courses in varying degrees. This kind of environment education and course of combining the traditional way is called “permeate” teaching. Teachers usually integrate environmental knowledge with natural science courses, for example, biology, chemistry, physics and geography [8, 18, 19, 20], guide students to pay attention to the surrounding environment, and help students to develop a preliminary understanding of the basic principles of environmental science [21].

However, there are also exceptions to the above-mentioned permeate teaching. In primary school, some schools will combine environmental education with art subjects such as painting and music. For example, Xuefu Primary School has a featured music course that combines environmental education with music [22].

Although the way of integrating environmental education into traditional subjects has met the demand of widespread environmental knowledge in a short period of time, there are still three important problems as follows:

1. Environmental teaching is mainly for instillation courses, lacking of practice;
2. Low degree of attention and less course time;
3. It is difficult for amateur teachers to provide professional teaching [20][23].

Since the new century, the rapid development of Shenzhen's economy has gradually aroused people's awareness of environmental protection and provided a foundation for the implementation of more perfect environmental education methods. For the above reasons, people gradually began to call for the transformation of environmental education [19][20], began to explore a new way to achieve better and more complete environmental education.

2.2.2. *Isolate Curriculum*

Although permeate courses can give students more opportunities to get in touch with these knowledge, they also have the disadvantages of lack of systematic knowledge and scattered content. In order to deal with this kind of problem, some schools start writing school-

based teaching materials, and special environmental education courses [24], and the Chinese Ministry of Education promulgated in 2003 “special education outline of environmental education of primary and middle school students” is put forward in the interdisciplinary penetration, on the basis of environmental education, education to carry out isolate projects.

“Isolate curriculum” refers to environmental education on a single topic, which may involve knowledge from multiple disciplines simultaneously. In terms of education methods, isolate courses will mobilize students' initiative more on the basis of teaching, and introduce discussions, experiments and other links. In 2005, some scholars pointed out that “(Shenzhen) lacks systematic teaching materials for cultivating environmental quality” and “environmental education policies are poorly implemented and supervised” [25]. As primary and secondary education in the general direction is still examination oriented, so permeate education is still in the main position in practice and theory. Although the proportion of environmental protection theme education in future teaching practice has increased, it is still a supplement to permeate the curriculum.

The isolate curriculum in Shenzhen is mainly based on the requirements of the government through school-based curriculum. Most schools focus on self-developed school-based courses, such as *Cultivating the Four Seasons* developed by Lanzhu School [26]. However, most of these self-written textbooks are not normative and blind [25]. Some schools will introduce the curriculum of specialized institutions in foreign developed countries to solve the above problems. For example, Shenzhen Middle School [22] has introduced and localized the curriculum of Water Education developed by the North American Water Resources Education Foundation. However, such schools are still in the minority.

In terms of the stage distribution of isolate courses, most of them are offered in primary school, while there are few in middle school, which should also be related to the increase of selective examinations in middle school.

2.3. *Educational Activities*

2.3.1. *Family-school Interaction*

Environmental education in Shenzhen is not only limited to the teaching of students in school, but also tries to mobilize students' family members to participate in the environmental education. At the same time, it can realize the impact of environmental knowledge on students' parents.

For instance, Pingshan Primary School carried out the activity of “Reduce waste discharge, make environmental enzymes”, which invited student representatives and

parents to make garbage decomposition enzymes and promoted this technology to the community [27].

2.3.2. Honorary Title Evaluation in Schools

In terms of environmental education, many schools in Shenzhen have continued the tradition of awarding honorary titles to individuals and groups for outstanding academic or moral performance in China.

For example, in order to monitor and commend environmental protection activities, Shenzhen Oriental English College has long conducted the evaluation of civilized classes, civilized dormitories, environmental protection guardians and Civilized Stars [28].

2.3.3. Environmental Innovations

In the practice of environmental education, some primary schools in Shenzhen have taken the form of combining environmental protection activities with innovative activities.

The "Life science and Environmental science Research Institute" of Yueliangwan primary school in Nanshan district organized students to research life science and environmental science, such as mangrove ecological research, water ecological restoration and utilization research, mushroom cultivation, etc., with the help of College of life science in Shenzhen university [29].

Besides, science clubs in Nanshan Zhuguang Primary School carried out ecological research, and obtained the "special report on the use of supermarket plastic bags", "washing machine wastewater automatic flushing system research report" and other results [30].

3. CONCLUSION

The construction of environmental education system in Shenzhen is mainly carried out in three aspects, namely education places, education curriculum and education activities. In the past two decades, Shenzhen has successfully established many educational places with green schools as the core, environmental education bases and natural schools as the auxiliary, and it effectively improved the environmental awareness of primary and secondary school students through a large number of permeate and isolate curriculum construction and active education methods. The following characteristics can also be easily sorted out from the development of the past two decades: Environmental education in Shenzhen is mainly based on permeate curriculum, supplemented by related activities and isolate curriculum, and the relevant isolate curriculum and activities are mainly concentrated in the primary school stage. However, as students get older, their activities and isolate courses decrease while the depth of their courses increases. In addition, as a whole, environmental education in Shenzhen has

gradually changed from the aim of popularizing knowledge to the aim of increasing knowledge in the past two decades.

However, in reviewing the achievements of Shenzhen environmental education in the past 20 years, it is not difficult to see that there are many problems, many of which are already existed and have been given solutions, but have not been effectively solved so far, such as the shortage of teachers, the lack of systematic teaching materials. To solve these problems, the continuous efforts of educators are still needed.

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