Study of Vegetation's Impact and Green Schools on Students' and Teachers' Knowledge, Attitudes and Behaviours on Environment in Zhengzhou City in Mainland China

by

WEI, Ran

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Statement of Originality

I, WEI, Ran, hereby declare that I am the sole author of the thesis and the material presented in this thesis is my original work except those indicated in the acknowledgement. I further declare that I have followed the University's policies and regulations on Academic Honesty, Copyright and Plagiarism in writing the thesis and no material in this thesis has been submitted for a degree in this or other universities.

WEI, Ran

July 2022

Abstract

Based on the development wave of green school movements worldwide, since 2000, mainland China has vigorously developed green school projects with environmental education as its development policy. Since 2018, following the evolution of green school projects in mainland China, the capital city Zhengzhou of Henan Province has taken the lead in implementing the green school project locally with the evolution of green school projects in mainland China as the guiding background. Therefore, the present study is based on the green school project context to study the implementation of the project in Zhengzhou City of Henan Province in mainland China. The present study examined the vital selection criteria for the green school project in Zhengzhou City (the vegetation coverage area of the campus needs to reach 37% and above), by comparing the 5th and 6th Grade students' perceptions on the impact of vegetation in different types of schools, and explored the implementation of the green school project by comparing the environmental knowledge, pro-environmental attitudes, and pro-environmental behaviours regarding the environmental literacy of teachers and 5th and 6th Grade students, and in green and non-green schools in the capital city of Zhengzhou, Henan Province in mainland China. Both quantitative research and qualitative research were used into the study to examine students' and teachers' performance. The findings illustrated that students who study in green schools with adequate vegetation coverage have higher perceptions ($p < 0.001$) on the impact of vegetation on reducing psychological pressure, improving studying awareness, and environmental awareness**.** Meanwhile, it can be observed that these three components regarding environmental literacy of students and teachers in green schools were significantly higher ($p < 0.001$) than in non-green schools. One of the more significant findings to emerge from this study is that developing the green school project in Zhengzhou City is practical and conducive to teachers and students. Furthermore, the current study also compared the environmental knowledge, pro-environmental attitude, and pro-environmental behaviours of teachers and 5th and 6th Grade students in different school types. Results revealed no significant

differences in these three above-mentioned components regarding environmental literacy ($p > 0.05$) in teachers and 5^{th}-6^{th} Grade students. Among the four non-green schools, teachers and students in School D (one non-green school planned to apply to be the municipal-level green school) preparing to apply for municipal-level green schools showed the most positive performance in these three above-mentioned components. In addition, this study conducted a linear correlation analysis ($N = 485$) on green and non-green school students' environmental knowledge and pro-environmental attitudes ($r = 0.163$, $p < 0.01$), environmental knowledge and pro-environmental behaviours ($r = 0.184$, $p < 0.01$), or pro-environmental attitudes and pro-environmental behaviours ($r = 0.072$, $p > 0.05$). A significant and positive linear correlation between students' environmental knowledge, pro-environmental attitudes, and pro-environmental behaviours could be observed in the results. In contrast, it could be discovered that there was no linear correlation between environmental knowledge and pro-environmental attitudes, environmental knowledge and pro-environmental behaviours, or environmental attitudes and environmental behaviours among teachers in green and non-green schools ($N = 48$). However, the relevance of the interview survey is clearly supported by the current findings that most of the teachers argued that environmental knowledge could affect their pro-environmental attitudes and pro-environmental behaviours. Therefore, the current study also proposes that, according to the analysis findings of the quantitative research, it can be concluded that teachers' performance is more in line with the requirements for the education for sustainable development (ESD). In this regard, the current study suggested that the green school project should be integrated into the development of ESD in the future. Results from the present study revealed that the green school project in Zhengzhou City is feasible and provided implications for future project development.

Keywords: Green School, Environmental Knowledge, Environmental Attitudes, Environmental Behaviours, Perceptions on the Impact of Vegetation

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List of Abbreviation

ADHD Attention Deficit Hyperactivity Disorder

AuSSI Australian Sustainable Schools Initiative

DESD Decade of Education for Sustainable Development

EE Environmental Education

EfS Education for Sustainability

ESD Education for Sustainable Development

FEE Foundation of Environmental Education

GAP Global Action Plan

IEEP International Environmental Education Program

IUCN International Union for Conservation of Nature

NAAEE North American Association of Environmental Education

NEP New Environmental Paradigm

NGOs Non-governmental Organisations

OCT Overseas Chinese Town Primary School

PISA Programme for International Student Assessment

SD Sustainable Development

SDGs Sustainable Development Goals

U.K. United Kingdom

UN United Nations

UNEP United Nations Environment Program

U.S. United States

WCS World Conservation Strategy

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Chapter 1

Introduction

1.1 The Trend of Sustainable Development (SD) in the World

Nowadays, it is necessary to develop sustainable projects to solve the problems between human beings and the earth through the development of projects to ensure the harmony between human beings and nature in the earth (Morelli, 2011). In 1980, sustainable development began to appear. "Sustainable Development" concept first appeared in the World Conservation Strategy (WCS), proposed needs (UN, 1987). by the International Union for Conservation of Nature (IUCN) in 1980. In 1987, the World Commission on Environment and Development (UN, 1987) defined sustainable development (SD) as “development that meets the needs of the present without compromising the ability of future generations to meet their own In addition, in the United Nations' 1987 report "World Commission on Environment and Development: Our Common Future," it was pointed out that the goals of sustainable development can meet the development needs of today's human beings while maintaining the well-being of future generations (Ratner, 2004). Therefore, aims of sustainable development attracts groups with entirely various innovation. It can do this through the vagueness or even vagueness of the term itself. This inaccuracy is significant because "development" is used in various contexts, from the industrial and commercial world to the social and human welfare fields (Davidson, 1996).

In 2000, the Earth Charter expanded the definition of sustainable development to include the aim of a global society (Initiative, 2000). The purpose of sustainable development projects is to propose ways for human beings to live in harmony with the natural world and to protect the earth's ecological environment from damage as much as possible. At the same time, it also balances competing demands, such as technological development and economic progress

(Dragomir, 2020). According to a document published by UNESCO, SD is "the ultimate goal of the relationship between human beings and the environment" (UNESCO, 2005). (UNESCO, 2005). In 2005, the Brent Land Commission published the new SD concept as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (UNESCO, 2005).

UNESCO (20005) aims to increase opportunities for a good education on sustainable development at any levels and in any social contexts. This opportunity will help change some of the environmental issues in today's society by reorienting education and enabling people to develop the knowledge, skills, values, and behaviours which they need. Meanwhile, the aim is also to focus on integrating sustainable components into education. In addition, it fosters a greater sense of responsibility, an awareness of cultural diversity, and the ability to overcome difficulties and contribute to the world's sustainable development goals (Waswa et al., 2007). Meanwhile, UNESCO has published a ten-year plan to ensure global environmental sustainability. The United Nations Decade of Education for Sustainable Development (DESD) (2005-2014) is committed to coordinating and applying the global education system and helping to implement sustainable development in the future. Chapter 40 of Agenda 21, the official document of the Earth Summit in 1992, mentioned education as a way to achieve SDGs. The overall goal of the United Nations (UN) DESD is to cooperate sustainable development principles, values, and practices into all components of education. UNESCO is the lead agency for DESD. At the same time, UNESCO cooperates with a variety of United Nations agencies, programmes, and organisations concerned with DESD (UNESCO, 2005). In 2015, the international community launched 17 Sustainable Development Goals (SDGs) to develop some environmental issues. However, reaching these goals needs profound and lasting changes in the way for human's life and behaviours (UNESCO, 2015).

1.1.1 The Education for Sustainable Development (ESD) in the World

Education can work on the new prospect for global sustainability; ESD provides scholars of all ages with the knowledge, skills, values, attitudes, and motivation required to face the worldwide changes (UNESCO, 2015). Since 1992, UNESCO has promoted ESD. It caused the United Nations Decade of ESD from 2005 to 2014 and is now the pioneer, the Global Action Plan on ESD. During this period, UNESCO also published the Decade of ESD. The Decade of Education for Sustainable Development (2005-2014) (DESD) proposed to cooperate the criteria and innovation of sustainable development (SD) into the whole items on education and studying. It also aims to encourage to transform knowledge, values, and attitudes to promote all society to be more sustainable in the future (UNESCO, 2015). In 2009, UNESCO also put forward sustainable development goals in various aspects. The goals and practical theory of ESD are defined as follows: a transformative and reflective process is a purpose of integrating the values and perceptions of sustainable development into the educational system and in everyday personal and professional life; an approach that empowers people with fresh knowledge and skills to assist in fixing problems; a future that challenges shared problems of the collective lives of global societies; a life that achieves economic and social justice and a holistic approach that respects all people; and a way to enhance the level of primary education, adapt existing educational projects and enhance awareness (UNESCO, 2008). DESD officially came to an end in 2019 when UNESCO launched the five-year (2015-2019) Global Action Plan (GAP) on ESD at the UNESCO World Conference for Sustainable Development (GAP) in 2015. And the aim is to enlarge ESD action, where the five elements (knowledge, skills, values, attitudes, and motivation) of advancing policy, changing the learning and training environment, developing the capacity of scholars, mobilising youth, and promoting the local level are the main actions of the programme objectives. The programme will end in 2019 (UNESCO, 2015). With the continuous progress of ESD, after 2019, UNESCO proposed a new

development plan after GAP to promote ESD. In 2030, ESD should achieve the goal of sustainable development, and for the plan for 2030, ESD should have to face new changes and challenges. ESD must focus more on each learner's transformation process and how it happens (UNESCO, 2019). As knowledge is acquired, learners begin to realise some realities; through critical analysis, they begin to understand the complexities of reality; experiential engagement can lead to an empathetic connection to reality. The five main components of GAP have not changed much, but some adjustments have been made to ESD. UNESCO hopes to realise ESD by 2030 (UNESCO, 2019) fully.

Nowadays, ESD has become a responsibility implemented and performed by all countries globally. However, research on ESD is also in the development stage, and limited, and the research on the impact of ESD on human beings is still in an exploratory stage. At the current stage of ESD, many scholars have argued to convert environmental education to education for sustainable development. Some scholars have proposed that the tension between EE and ESD can be summarised into four different areas: institution, content, purpose, and process (Wesselink & Wals, 2011). In comparison, ESD represents a shift in EE towards a more extensive anthropocentric orientation (Kopnina, 2018). Some Western countries are more active in researching the impact of education on sustainable development than other countries. In 2016, for example, some scholars in Sweden conducted a survey and research on students in some schools in Sweden that implemented ESD or aimed at sustainable development strategic goals. They designed a set of measurement methods based on a Likert scale to measure students' awareness of sustainable development in different grades. However, the study results showed that implementing ESD into the United Nations DESD in the Swedish compulsory education system significantly impacts students and SD dimensions. The related cognitive, attitudinal, and behavioural effects were not particularly successful. Therefore, the researchers suggested that the definition and perception of schools related to ESD in Sweden could be

updated (Olsson et al., 2019). Prior to 2018, there were only almost 26 papers covering research on ESD and environmental topics reflecting a comprehensive method to ESD and EE, including genetically modified food (Dovros & Makrakis, 2012). Murray et al. (2014) examined the value of the scholar base on sustainability, while Zeegers and Clark (2014) used the assessments of students to assess their awareness of sustainability. However, the impact of ESD worldwide needs to be more widely concerned and researched.

1.2 Environmental Education (EE) in the World

EE evolution can trace back to the 1970s. Since the 1970s, EE has always been part of the educational agenda. EE programmes and other programmes, all of which changed in 1992; the focus of Agenda 21 (UN, 1992) is to shift environmental education to sustainable development (UN, 1992). EE is the way for people to perceive values and promote notions. It aims at cultivating the knowledge and abilities to know and perceive the interrelationships between human, cultural, and biophysical environments. EE also needs to practice environmental quality issues for deciding and self-setting of codes of conduct (UN, 2016). "Sustainable Development (SD)" is suitable for educational purposes depends on the conceptualisation of education. Reflecting on the educational theories of the 20th century, academic analysis has shed light on the tension between mainstream trends and emerging viewpoints, which became more and more common as the end of last century approached (Shepard, 2000). With more scholars increasing attention to global warming and climate change, more scholars in environmental education believe that EE is an essential way of public engagement and opportunities for additional resources (Potter, 2010). EE is also critical in all aspects of sustainable development. Therefore, EE can promote SD.

However, the context and historical development of EE are comparatively new. EE is an organized educational work that teaches people how to properly use nature, mainly focusing on developing human management behaviours and understanding ecosystems to achieve sustainable development and promote harmonious coexistence with nature. It is an interdisciplinary field that combines biology, mathematics, geography, and many other disciplines. According to UNESCO, environmental education is vital to protect the environment, eradicate poverty, reduce inequality, ensure SD and maintain the quality of life in the global society of the Future (UNESCO, 2014). The origin of EE can be put forward to promote nature and outdoor learning in elementary schools and then to conservation sports through Australia's school camp movement, "Nature Research in Ordinary Schools," biological research has received attention (Gough, 2020). With a broad background in the education and non-government sectors, environmental education has become the subject of several policies, as well as legal and political tools (Stevenson, 2007).

UNESCO's development and evolution of EE can date back to 1948 with the creation of the IUCN (International Union for Conservation of Nature, now the World Conservation Union), the first NGO primarily mandated to help protect the natural environment. In 1972, UNESCO participated in the United Nations International Conference on the Human Environment, held in Stockholm, Sweden, which led to the establishment the United Nations Environment Programme (UNEP). Subsequently, UNESCO and UNEP co-led the International Environmental Education Programme (1975-1995) for the past two decades, providing vision and implemental guidance for mobilising the education towards the environmental components. In 1976, UNESCO connected the Environmental Education Communication "Connect" as the UNESCO-UNEP International Environmental Education Programme (IEEP). As a general clearinghouse for EE information, it is dedicated to putting forward the purposes and

organising activities for the IEEP, a network of organisations and individuals who have demonstrated a significant interest in environmental education and have been actively involved in education until 2007 (Frazen, 2017). ESD has been globally recognised as an integral part of the level of education and a primary driver of SD. The global society's Sustainable Development Goals (SDGs) (external link) include ESD over the next 15 years. SDG 4 Education 4.7 addresses ESD and related approaches, such as education for global citizenship. UNESCO coordinates the Global Action Programme on Education for Sustainable Development (GAP) (UNESCO, 2015). Through UNESCO's emphasis on the evolution of EE, it has revealed that some countries have arranged EE as an independent curriculum, which reveals the significance and meaning of EE. The following figure 1.1 presents the development process of EE.

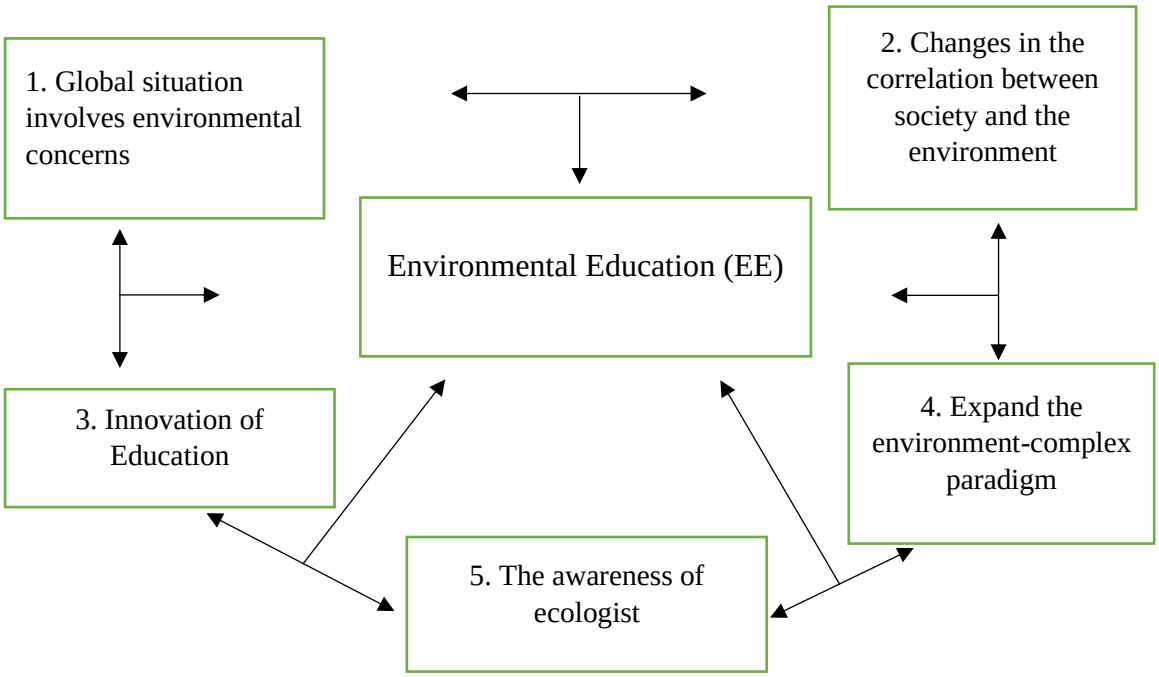

Figure 1.1

The Development Process of Environmental Education (Gómez, 2005).

1.2.1 Green Schools in the World

The emergence of green schools was in 1992. At the United Nations (UN) Conference on Environment and Development, the concept of green schools was put forward. In the months after, green schools were piloted in various countries. The names of green schools in various countries are also different, including Eco-Schools, Enviro-schools, Green Schools, Sustainable Schools, Resource Smart Schools, and so on (Gough, 2004). The purpose of the green school is to take the global community, students, and teachers as the themes. It intended that students can foster the ability to solve environmental problems through their studies in the school and improve students' overall environmental awareness and environmental behaviour.

Meanwhile, green schools are also essential for cultivating students with a sustainable development mentality based on environmental education (Gough, 2005). Despite this, the origin of the concept of green schools is still elusive, but our currently recognised thinking about them is inevitably derived from the Global Report of the Environmental Development Council (Brundtland, 1987). The purpose and criteria for establishing a green school are protecting biodiversity, the precautionary principle, intergenerational equity, and environmental cost accounting (Iwan & Rao, 2017; Smith, 2006). However, even though the names of Green Schools are various around the worldwide area, but the purpose and significance of establishing them are the same. Green schools also take the school as the main body vigorously promoting and developing EE and uses the school to reflect the goals and objectives of how environmental education is implemented in a region (Bolstad et al., 2004). Green school movements also aim to provide a framework for the schools to become a model of sustainable development in a region.

Furthermore, this framework includes repositioning green schools as sustainable development, formulating environmental policies and objectives, action plans, in-service teacher education, and beneficiaries in sustainable development for deciding. The goal of the green schools is to

enable students to have aspiring motivation, cultivate their capacity for action, and increase their enthusiasm for participating in sustainable development plans. Therefore, the emergence and development of green schools are continuously promoting the environmental education of the entire society and the sustainable development of the environment. The most outstanding value of green and ecological schools is that they can be successfully turned into tools for sustainable development education and reasonable measures to promote SD (Gough, 2020).

1.2.2 The Development of Green Schools in the World

Different countries call green schools by various names, but the concept and purpose of green school development are entirely the same. The present study gives a brief introduction to the progress of green schools globally. First, green schools are also widely referred to as ecological schools. Ecological schools are a global sustainable development education programme under the Foundation of Environmental Education (FEE). Since its launch, it has proposed an innovative method to facilitate to study inside and outside the classroom. The environmental issues were brought closer to students in an effortless way so they are more aware of environmental problems and can effectively solve them (Andreu, 2020, p.33). The Eco-School Programme aims to enable schools to improve their own and local communities' environments while positively impacting the youth. UNESCO also published the eco-school initiative to enable youth to positively participate in and protect the environment around the world. Through this programme, youngsters can dedicate to their school's environmental management policy, earning Green Flag prestige and getting the sense of achievement (UNESCO, 2015).

However, the names of green school movements are different in the distinguished region. Even though the names are different, the development philosophy of green school movements worldwide is similar. They can be defined as Eco-Schools, the world's most extensive sustainable school programme, ecological school programme, and even green school

programme. An ecological school can be defined as a school that fulfils its primary educational function and is sustainable. Development thinking has been fully integrated into management. By implementing environmental management, carrying out practical environmental education activities, creating a cultural scope for environmental protection, and encouraging people to take actions to ensure environmental protection and sustainable development and enhance the environmental literacy of teachers and students can promote the sustainable development of society comprehensively. Eco-schools can even involve teachers and students in school environmental education activities to expand school-community cooperation and connections. It also helps to develop the basic knowledge, skills, attitudes, emotions, values, and ethical behaviours required for sustainable development in the actual participation process; that is, enhancing the abilities of the whole faculty and staff and to promote to organise environmental protection actions through students' environmental literacy and achieve the purpose of sustainable development (Eco-Schools Global, 2018). It starts in the classroom and gradually expands into the community by engaging the next generation in action-based learning. From 1994 to 2019, the Eco-School Programme encourages the younger generation to use innovative thinking and advanced vision to change the environmental issues that arise in their lives. Since launching in many European countries, the programme has expanded to 59,000 schools in 68 countries around the world (Pauw & Petegem, 2011).

Foreign scholars have shown that through the two factors of a green school, healthy indoor air and acoustics, the physical health of teachers and students can be improved, and the students also have a better education level. According to previous research, getting exposed to indoor environmental elements can be controlled, such as controlling the level of carbon monoxide, dust, and pollen can avoid 65% of children from asthma. Carnegie Mellon University's research shows that holistic health perspective has improved by 41% (Bell & Dyment, 2008). NCES pointed out that optimising the sound of the classroom for children is the elementary basis for

studying and helping to maintain the health of the teacher-ordinary teachers who are absent for two days each year due to vocal cord tension (Snyder et al., 2019). When teaching and studying in a high-performance acoustic environment, it can provide students and teachers with the chance to communicate effectively. Thus, a green school provides an environment for the reduction of distractions and installing a sense of pride and importance in all (Andreou, 2020, p.33). Therefore, the establishment of ecological schools helps to achieve the SDGs.

The contributions of green schools worldwide are also very significant. Here, a brief introduction of the remarkable development of green school movements in other countries around the world is introduced. Green Schools appeared in Australia in 2002. The government established the Australian Sustainable Schools Initiative (AuSSI). This project enables schools to take a planning framework for operating resources and integrate the environmental education for sustainability (EfS) into a holistic school approach. Green schools in Australia encourage schools to make efforts to promote schools and communities to achieve the goal of sustainable development, which is a good measure to recommend the sustainable development of society (Gough, 2020). In Ontario, Canada, the Eco-School Program has turned into one of the basic programmes for environmental development. Around 900,000 students participate every year. The Eco-School Program in Ontario, Canada, aims to cultivate environmental pioneers, decrease the effect of schools on ecology, and establish an environmentally responsible school community (Simonetti, 2007). In Germany, the European Eco-School is an award of the Foundation of Environmental Education (FEE), which is cooperated by the German Environmental Education Association. The award is granted to schools that enhance pro-environmental awareness and the pro-environmental behaviours of students. The schools apply for the award with the concept of self-development (Bybee, 2013). The Green School Programme in Africa is also remarkable. It is worth to mention Kenya at this point. The Kenyan Eco-School Program has been developed simultaneously with the global evolution agenda,

including the Millennium Development Goals and the DESD. The Kenya Environmental Organisation has been implementing this plan since 2003, expanding the pilot project of 12 Green Schools to more than 1,000 primary and secondary schools (Government of Kenya, 2007). The Green School Programme in various countries and cities in Asia has also achieved remarkable achievements. The most representative region is Hong Kong where green school projects are at the maximum level in Asia and even the world. The Green School Project has established a special Green School Award which is a school award scheme sponsored by the Hong Kong Environmental Campaign Committee since 2000. The aim is to encourage schools to promote environmental policies and management plans for green schools by improving pro-environmental awareness, cultivating environmental attitudes toward protecting the environment, and carrying out green trainings by school administrators, teachers, non-teaching staff, and students. The schools participating in this award are mainly pre-primary, primary, secondary, and special schools. It is jointly organised by The Education University of Hong Kong, the Hong Kong Productivity Council, and the Vocational Training Council (Hong Kong Education Bureau, 2014). In addition, green school movements have developed in other regions of Asia, which have also been briefly introduced in the present study. Taiwan has implemented green school movements since 1999, including the green school partnership and sustainable schools projects. The link between the green and sustainable school projects was effectively developed through a central integrated monitoring system facilitated by local education bureaus. However, fewer schools have participated in and applied to be a green school project since comprehensive supervision was lifted in 2016. The long-term advancement of the sustainable school project has also been fatigued, which has led to reforms of the green Schools Partnership and the Sustainable Schools Program, including the transformation of the Green Schools programme's platform into a single window for environmental education and a portfolio of materials for other environmental education programmes and resources of various departments.

In order to further promote the development of the green school movement in Taiwan, scholars have also proposed solutions, hoping to link the green school movement in Taiwan with the international community in order to achieve the goal of better promoting green schools (Wang, 2020, p. 333). The green school movement has been launched in Turkey since 1995, and TÜRÇEV (Turkish Environmental Education Foundation) has launched their "Green School Programme" called the "Eco School Programme" in Turkey. TÜRÇEV complies with the Foundation for Environmental Education (FEE) regulations. It also aims to develop children's knowledge about environmental awareness, environmental management, and sustainable development in preschool, primary, and secondary schools using the Eco-School Programme. And research conducted on Turkish ecological schools since 2005 shows that children are learning the elements of ESD through various methods, both in ecological and non-planned schools (Taşar, 2020, p. 345).

The Ministry of Environmental Protection has accredited the Green School Project in Israel. The project dedicated to the recycle, aiming at improving recycling, promoting energy efficiency, and implementing EE programmes. In contrast, the green school project in Israel has received less public attention, and the Israeli government has been committed to developing green school programmes (The Ministry of Environmental Protection and Ministry of Education, 2017). The Green School Project in Sweden is also in a thriving stage. The green schools in Sweden are mainly developed to solve real environmental problems in Sweden. Moreover, according to the progress of green schools, a reward system has been established, which is the widely regarded Green Flag Award (SWEDESD, 2018). The Green School Project in the United Kingdom (U.K.) can be traced back to the fact that some schools in the U.K. can solve the problem of "green"; these schools are often called "ecological schools" or "sustainable schools," and many parts of Europe have international ecological school programmes. With the current data available, in England, about 18,000 schools are participated in the scheme (Eco-

Schools U.K., 2018). In the United States (U.S.), the green school project stems from the increasing acceptance of new green school buildings, and the provision of green schools for students to increase their environmental knowledge and change the capability of existing environmental issues. As of 2019, as many as 9-12% of the U.S. K-12 schools have a green school programme, and most of schools use outdoor gardens and nature classrooms as part of their educational methods. Many elementary, middle, and post-secondary schools in the U.S. are going green in this way, and whether it is simply trying to reduce energy bills or building new green school buildings, the U.S.'s commitment to green school programmes is highly commendable. Therefore, developing green schools in the United States has always been at the world's highest level (Alam, 2017).

1.2.3 Green School Movements in Mainland China

Green school Movements in mainland China have been developed under environmental education (EE) and overseas sustainable education waves. In December 1996, the Ministry of Industry and Information Technology, the Ministry of Ecology and Environment, the Central Propaganda Department, and the Ministry of Education issued the "National Environmental Publicity and Education Action Plan (1996-2010)". It first mentioned that by 2000, "green schools" would be built across the country. The expansion of the green school project in mainland China began in 2000. EE and Communication Centres in mainland China carried out the green school project in the country, provinces, autonomous regions, and cities from 2000 to 2006. The development of green school projects is one of the critical characteristics of promoting environmental education in mainland China (Huang & Lee, 2020, p. 125). In 2002, the Environmental Education and Communication Centre of the Ministry of Environmental Protection compiled the "Green School Guide," which clarified green schools' development policy, aims, and selection criteria as a clear guide for creating green schools. By December

31, 2002, there were 13,183 green schools in mainland China (Ministry of Education of the People's Republic of China, 2003b). In 2009, the EE and Communication Centre of the Ministry of Environmental Protection issued the brand new "Green School Guide," focusing on building ecologically civilised and environmentally friendly schools. After the State Council put forward the "Decision on Implementing the Scientific Outlook on Development and Strengthening Environmental Protection" in 2005, many schools voluntarily participated in the green school project. Teachers and students positively participate in some environmental protection activities to promote the SD (He et al., 2017).

In 2008, green schools have exceeded 42,000, spreading all over 31 provinces, autonomous regions, and municipalities directly under the Central Government in mainland China. More than 90% of cities have green schools. In 2009, the Eco-School Project of the FEE was put forwarded in mainland China, and the school started to actively promote Eco-School as a new type of green school project. By 2016, more than 3,000 schools have participated in the project's training and exchange activities. To distinguish clearly, "green schools" and "ecological schools" coexist under the Green Schools Project in mainland China. On October 18, 2017, the 19th National People's Congress helped the construction of ecological civilisation and pointed out a specific guideline for the future green development of China. In summary, the implementation of the green school project in mainland China is essential for the environmental education movement in the world (Huang & Lee, 2020, p. 125). The establishment of green schools is an effective way of EE for adolescents (Wang & Zhang, 2011, p. 54). The construction of green schools is conducive to cultivating primary and secondary school students to protect the environment (Qiu, 2003, p. 124).

The present study mainly investigated the implementation of the green school project in the capital city of Zhengzhou City in Henan Province. Because Zhengzhou City is located in the central plain of mainland China, with the development of the economy, culture, and education in recent years, this city has achieved the level of first-tier cities in mainland China. Therefore, it can represent, to a certain extent, the development of education and the development of the green school project of other cities in the central plain of mainland China. Therefore, the brief-description of the green school project in Zhengzhou City in Henan Province has also been introduced. Therefore, the brief-description of the green school project in Zhengzhou City in Henan Province has also been introduced. As previously mentioned, the development of the green school project in each city and province in mainland China is different, and corresponding development guidelines and selection criteria will be proposed according to the local geographical environment. In Henan Province, there are one third level green schools, namely, i) national-level green schools; ii) provincial-level green schools; and iii) municipal-level green schools. The development policy of the green school project in Zhengzhou City and Henan Province is to fully incorporate the idea of the sustainable development into the management of daily work based on the school's realisation of its essential educational function. The goal of the green school project is to carry out practical environmental education activities to wholly improve the environmental literacy of teachers and students, and allowing them to develop basic knowledge, skills, attitudes, emotions, values, and behaviours for environmental protection in these environmental protection activities. When a school first meets the selection criteria for municipal-level green schools, it is eligible to be compared with green schools in other cities in Henan Province, while provincial-level green schools and municipal-level green schools have similar selection criteria and the selection criteria of municipal-level green schools for each city is the same. Based on the selection criteria of municipal-level green

schools, provincial-level green schools focus more on managing and implementing environmental education in each municipal-green schools.

In detail, the selection criteria of the provincial-level green schools in Henan Province are divided into four parts (Henan Education Bureau, 2020) which showed in Table 1.1.

Table 1.1
Selection Criteria of Provincial-level Green Schools in Henan Province

Title	Content
School Environment Management	1. Perfect environmental management system 2. Campus greening 3. Clean environment 4. Pollution control 5. Save resources and energy
School Environmental Education Management	1. Leadership attaches importance 2. Complete information 3. Environmental training for teachers 4. Publicity
Environmental Education Process	1. Classroom environmental education 2. Extracurricular environmental education
Environmental Education Effects	1. Environmental attitudes 2. Environmental behaviours 3. Award-winning achievements related to environmental education

Here, based on the research site Zhengzhou City, a brief introduction of the policy and selection criteria is introduced. By the end of 2021 (statistics include universities, secondary schools, primary schools, and kindergartens), more than 300 schools have been the "Municipal-level Green School," about 60 schools have been the "Provincial-level Green School," and four schools have been granted with the title of "National-level Green School" in Zhengzhou City. Zhengzhou Green Primary Schools only account for 10% of the total in fact. The area covered by vegetation in green schools is fundamental and only hardware for the requirement to establish green schools. The green coverage rate on campus equals or more than 37%. The

selection criteria for green schools in Zhengzhou City are mainly divided into four parts (Zhengzhou Education Bureau, 2021) which represented in Table 1.2:

Table 1.2

Selection Criteria of Municipal-level Green School in Zhengzhou City

Title	Content
School Environmental Construction	1. Campus greening plan 2. Sanitation status 3. Pollution control
Administrative Management	1. Leadership attaches importance 2. System improvement 3. Complete information 4. Publicity activity
Environmental Education Process	1. Environmental education training 2. Classroom penetration 3. Activity 4. Education inspection
Education Effects	1. Pro-environmental attitudes 2. Environmental education effects 3. Community service 4. Pro-environmental behaviours

1.2.4 The Effects of Vegetation for the Community

The effects of local landscape and vegetation coverage area on people's health has been widely concerned and studied by many scholars (Bratman et al., 2015; Braubach et al., 2017; Hartig et al., 2014; Li et al., 2008; Logan, 2015; Roe & Aspinall, 2011). Studies have found that vegetation affects physical well-being and four social interactions: benefits to air quality, physical activity can be improved, increased pressure compensation, and social cohesion can be accelerated (Hartig et al., 2014). Green vegetation-covered spaces can reduce the 'urban heat island effect,' protect against heat-related health hazards, and help increase people's willingness to exercise (Villanueva et al., 2015). Growing research demonstrates that getting exposed to the natural environment and green spaces can effectively bring about mental recovery and relaxation while avoiding chronic stress and having potential benefits for health problems of attention fatigue (Hartig, 2007; Hartig et al., 2014). Vegetation can reduce neural

activity in the subgenicular prefrontal cortex and reduces the appearance of depressive symptoms (Bratman et al., 2015). Researchers in the U.K. have demonstrated that staying in some spaces covered by vegetation can reduce chronic pressure in adults living in poor urban communities using an innovative research method using circadian cortisol patterns (Beil & Hanes, 2013; Roe et al., 2011; Ward Thompson et al., 2016). Green spaces and vegetation are also helpful to people's immune systems. Some Japanese scholars have confirmed the association between walking in forests and the beneficial immune system through experimental research. These research results indicate that the immune system benefits from direct touch with the natural environment or exposure to green spaces (Li et al., 2008). The human microbiome concerning the natural environment can improve mental health (Logan, 2015). Green space and vegetation can also enhance people's mental activity and improve people's physical fitness. Some scholars have argued that the level of vegetation coverage in the city and definite facilities are beneficial for promoting actions in the elderly (Aspinall et al., 2010). In addition, doing some activities in vegetation coverage spaces may play a recuperative role for residents with mental illness (Roe & Aspinall, 2011). Numerous studies have shown that using vegetation can improve interest in physical activity and reduce sedentary time among adults, children, and older adults (Almanza et al., 2012; Astell-Burt et al., 2013; Cochrane et al., 2009; Lachowycz & Jones, 2011, 2014; Sallis et al., 2016; Schipperijn et al., 2013). Furthermore, physical activity with vegetation can be more restorative than without green vegetation-covered places (Barton & Pretty, 2010). Vegetation has also been shown to improve mental health and cognitive function. Human beings are in places with more vegetation have lower psychological pressure and better happiness than those living with less vegetation (White et al., 2013). Instead, planting much vegetation in the community can often effectively reduce people's depression and anxiety (Beyer et al., 2014; Bratman et al., 2015; Pope et al., 2015). In addition, higher vegetation cover at home and in schools was related to improved perception

(Dadvand et al., 2015, 2016). However, some scholars have suggested that although vegetation can bring various benefits, planting much vegetation is likely to cause people to be allergic to pollen and cause allergic reactions to other respiratory organs. Nevertheless, overall, the positive impact of urban green space on people overcomes its possible negative impact, while the most damaging effects are usually related to poorly designed or maintained green spaces. With proper planning, design, and management of planting vegetation downtown, damage from negative impacts can be effectively reduced or prevented (Braubach et al., 2017). As previously mentioned, vegetation coverage is a primary standard of the selection criteria for the green school project in Zhengzhou City of Henan Province. Therefore, based on these criteria and previous studies on the effects of vegetation, students' perceptions on the impact of vegetation were investigated in the current study.

1.3 Study Context

As an important province in the Central Plains of mainland China, Henan Province has always followed the construction of environmental protection and environmental education in mainland China. Therefore, Henan Province has actively promoted the Green School Project in mainland China. Since 2018, Henan Province has vigorously and continued to develop green school projects in most cities in the province (Henan Education Bureau, 2020). As the capital city of Henan Province, Zhengzhou City actively fulfils its environmental protection obligations and vigorously develops green school projects. As a result, the Zhengzhou Municipal Government expects that by the end of 2022, Zhengzhou municipal-level green schools can reach 60% (including universities, middle schools, primary schools, and kindergartens) (Zhengzhou Education Bureau, 2021).

Although green schools in Zhengzhou City have developed steadily and the selection criteria is systematic, the measurement of the implementation of green school projects in Zhengzhou City and even mainland China is still rare. The current study aimed to assess the construction policy and the implementation of the selection criteria for the green school project in Zhengzhou City by measuring students' and teachers' perceptions and the related content of environmental literacy of students and teachers.

Specifically, the current study measured the implementation of the green school project in Zhengzhou City through three parts:

1. In response to the greening requirements of green schools (vegetation coverage must meet the standard of 37% and above), a comparative study was made on the students' perceptions of the impact of vegetation in green and non-green schools.
2. Aiming at environmental education implementation in green schools is conducive to students, environmental knowledge, attitudes toward protecting the environment, and pro-environmental behaviours regarding students' environmental literacy in green and non-green schools were compared and studied.
3. According to teachers' environmental education and training in green schools, teachers' environmental knowledge, attitudes toward protecting the environment, and pro-environmental behaviours regarding environmental literacy in green and non-green schools were compared and studied.

The present study examined the implementation of the green school project in Zhengzhou City on students and teachers through specific research in these three parts.

Chapter 2

Literature Review

2.1 Green School Movements in Mainland China: Two Case Studies

The development of the green school project is the significant component of the environmental education (EE) in mainland China. Green school Movements in mainland China have been developed under the background of EE and overseas sustainable education waves. The present study will next briefly introduce the two most representative green schools in mainland China, namely, Urumqi middle school in Urumqi City of Xinjiang Province, and Overseas Chinese Town Primary School (OCT) in Shenzhen of Guangdong Province.

Shenzhen OCT Primary School started in 1991. It was awarded the "Green School of Guangdong Province" in 1991, awarded the "National Green Schools" in 2000, and awarded the "Green Flag Award of International Ecological Schools" in 2011. The location of the school backs the Yanshan Mountain and is nearby Shenzhen Bay. The school building has been established with the broad view of the sea in the distance and close view (Wang, 1992). To implement EE in the school, the school has carried out a series of measurements. Firstly, the school encourages teachers to compile the "Immersive Environmental Education Reference Materials for Four Subjects of Morality, Language, Nature and Environment, Social Integration into Primary School Teaching" to summarise the critical points of the knowledge for EE for teaching in class. Secondly, the school has incorporated environmental engineering into their teaching plan and stipulated to use the textbooks specified by the school, and conduct a monthly "environmental education course" in the natural class. Thirdly, EE is included in each lecture. For instance, in the "Making A Green Map of Our School" activity, the teachers skillfully

cooperate environmental education into the mathematics classroom. Through the drawing method of the coordinate axis, the students draw the environmental knowledge information obtained in the picture, which enables them to obtain environmental knowledge and also allows them to learn mathematics (OCT Primary School, Nanshan District, Shenzhen, 2004). The unique place for the school is that the teachers, students, parents, and all environmental lovers can be organised in the city to participate in the activity of planting trees. They have been turning carbon sink forests into "birthday forests." The students have celebrated their birthdays by planting trees in the woods and caring for them. This behaviour develops the emotion of nature in children and improves their environmental awareness.

Xinjiang Urumqi Middle School was established in 1952, and in 1999, it has been at the municipal and autonomous levels green school. In 2005, the school got the national level "Green School." The school is in a university, and provides teachers and students with perfect conditions to teach and learn in the school. For implementing EE, the school integrates classroom learning with extracurricular practice according to local resources. By participating in EE extracurricular activities, such as the “Environmental Education Rural Walk,” students can get the deep understanding of the environment and know the importance of EE training. Furthermore, the school promotes in-depth project-based learning, encouraging students to get out of the classroom and learn about nature. These rich EE resources help to enhance students’ environmental knowledge and environmental awareness toward protecting the environment. Furthermore, the school was the first to join the "Sino-Swiss Environment Master" programme in 2007-2009. Through research studies, group activities, and integrated practice, students were good at English, computer use, and environmental protection (Affiliated Middle School of Xingjiang Agriculture University, 2015).

These two schools are typical green schools in mainland China. Both have been constructed according to their geographical advantages. Although Shenzhen belongs to a developed area

and Xinjiang belongs to a less developed area, both schools use an immersion approach to implement environmental education, actively integrating environmental education into the classroom. However, only Shenzhen OCT Primary School has specially designed environmental education teaching materials for now. EE is an indispensable and essential component for developing green schools. The two green schools actively develop EE, focusing on course teaching, supplemented by extracurricular training and inquiry learning (Xie, 2004). Although the evolution of green school projects in mainland China is based on EE (Huang & Lee, 2020, p. 125), scholars suggest that each city should develop its standards for green schools according to the geographical location of each city (Wu, 2014). The establishment of green schools is an effective educational practice for Chinese youth (Wang & Zhang, 2011). Developing the green school project provides valuable school improvement experiences and new ideas for developing EE in primary and secondary schools (Huang & Lee, 2020, p. 125).

2.2 The Impact of Vegetation on Students

Exposure to the space covered by vegetation have a positive impact on people. Some studies showed that vegetation can reduce urban air temperature and improve the comfort of the urban environment (Mackey, 2012; Ng et al., 2012; Santamouris, 2014). Vegetation can improve people's physical activity (Barton et al., 2014; Dyment & Bell, 2008). There is growing evidence that exposure to an amount of vegetation is beneficial for health (Berman et al., 2012; Bennett & Jones, 2018; Herzele & Vries, 2012; Maas et al., 2009; White et al., 2013; Wu et al., 2014). The growing green area has a very significant help to the urban environment and landscape construction (New et al., 2016). Yang et al. (2009) has also proposed a positive correlation between vegetation and environmental quality; that is vegetation coverage area

canincrease air quality by reducing air pollutants. The above studies illustrate the benefits of vegetation on the community.

2.2.1 The Impact of Vegetation on Students' Psychological Pressure

Vegetation can affect students' awareness of perceived restorativeness positively and effectively (Bagot et al., 2015). One research result showed that vegetation increased students' mental perception recovery. Scholars have used the theory of attention recovery to examine the psychological perception recovery of children after playground activities covered by green vegetation. Among them, children from 14 schools (N = 550, 46% boys, age = 9.73 years old, SD = 1.21) participated in the research. After getting command of age, gender, and the area of playground vegetation coverage, playground activities covered with vegetation were found to be of great help to recovering their psychological perception (Bagot et al., 2015). Some scholars have researched the vegetation influence in the natural environment on alleviating the psychological pressure of children living in rural areas. The scholars collected data on 337 rural children in 3rd to 5th Grade (average age = 9.2 years old). The results showed that in rural environments, a higher level of nearby vegetation has a more significant effect on relieving children's psychological pressure. In comparison, the lower the vegetation level, the lower the impact on children's psychological stress in the environment (Wells & Evans, 2003). Some scholars also pointed out that vegetation and the natural environment exposed to vegetation can improve students' awareness of environmental protection, and behavioural and cognitive abilities (Cheng & Monroe, 2012; Collado et al., 2013). For example, researchers in Florida evaluated the perceptions of nature among students who received environmental education in local 4th Grade public schools and found that students' connection to nature affects their intention to attend to future activities. Furthermore, students with more exposure to the natural environment positively impacted their perception of nature and interest in engaging in

environmentally friendly behaviours. In addition, they had higher awareness of environmental protection (Cheng & Monroe, 2012). British scholars have studied children aged 3 to 7 years old in rural areas to reduce emotional problems through greenery. The study results found that rural children aged 3 and 5 years old had fewer emotional problems than their peers living in less green communities. Community green spaces can promote early emotional well-being among children in rural cities (Flouri et al., 2014). American scholars have made relevant observational and visiting studies on primary and high school students in Maryland and Colorado on the effects of vegetation on reducing psychological pressure and promoting pressure recovery. For example, the findings in Chawla et al. (2014) showed that primary school students played in wooded areas during recess; older elementary students used naturalised habitats in science and writing classes; and high school students who participated in gardening excursions were able to effectively reduce their physical and mental pressures. Some scholars have also proposed that the environment covered with a lot of vegetation can help improve students' self-discipline and improve children's attention (Faber & Kuo, 2009; Taylor et al., 2002). Among them, a study (Faber & Kuo, 2009) was conducted on 17 children with attention deficit hyperactivity disorder (ADHD) aged 7-12. The children took a short time walk in a park covered with vegetation in or near the city centre. The comparison results showed that children with ADHD who took walks in green-covered parks were more attentive than those who walked in or near urban centres for the same walking time (Faber & Kuo, 2009). Li and Sullivan (2016) conducted a randomised controlled experiment on students in high schools. The survey arranged students to classrooms with no windows or windows leading to architectural spaces or spaces covered with green vegetation, and the participants were arranged to study and rest in different classrooms. The experimental research results showed the green landscape to be very helpful for students to recover from pressure experience. However, the study found no evidence that pressure modulates the correlation between green

landscapes and attention recovery, discovering two different ways that affect the psychological and cognition of students. Some studies also focused on surveying the impact of vegetation on reducing students' psychological pressure. Amoly et al. (2014) surveyed a month-long study on 2,630 students from 2nd to 4th Grade in 36 primary schools in Barcelona, Spain, to study if students could improve their cognition and development through vegetation and spaces that were covered by abundant vegetation. The result illustrated a conducive relationship between living with green space and the cognition and development of primary school students. This result was found to be partly caused by the large amount of vegetation planting in schools that can absorb harmful gases and reduce air pollution. Secondary school landscape modifications that improve vegetation coverage are related with lower pressure levels and better mental health were investigated in a quasi-experimental study (Sellers et al., 2013). These previously mentioned studies have shown the impact of vegetation is conducive on students' health.

2.2.2 The Impact of Vegetation on Students' Academic Performance

The following research revealed vegetation' effects on students' studying performance. With the development of research of the impact of vegetation on students, scholars have also shown that the increase in tree coverage is also significantly positively correlated with the improvement of students' reading test scores (Hodson & Sander, 2017). Benfield (2015) proposed that vegetation in the student environment can improve academic performance. In the United States, scholars used the Twin Cities metropolitan area of Minnesota as a research area to examine the correlation between urban nature and the studying performance of students. They used regression analysis to determine the relationship between environmental variables (i.e., tree cover, vegetation cover, water cover inside and outside the school campus, as well as four measures of population-level 3rd Grade reading level and math success rate) to illustrate that vegetation cover can affect reading level and mathematics. The study results reveal an

obvious positive correlation between tree coverage and reading performance, which indicated that improving tree coverage in learning environments for students can support academic performance (Hodson & Sander, 2017). More and more scholars in the United States have been working on the favourable impact of vegetation on students. In 2010, Matsuoka's research showed that the abundance of vegetation on school campuses was positively associated with the academic performance of Michigan 9th graders, with higher vegetation coverage associated with better student achievement (Matsuoka, 2010). A study using GIS technology and aerial photographs to classify landscapes into servals found a positive correlation between trees and student test scores (Kweon et al., 2017). Leung et al. (2019) discovered that the students getting exposure in the high vegetation coverage campus can significantly improve their English and Mathematics achievement. Tree coverage has a stimulating impact on children's studying achievement (Sivarajah et al., 2018). Some scholars have also researched the relationship between vegetation reducing students' psychological pressure and improving classroom performance. Previous scholars' research on students getting in touch with nature shows that the various vegetation in and around a campus significantly influenced students' performance (i.e., standardised test scores, graduation rates) (Matsuoka, 2010; Wu et al., 2014). Exposure to nature is very beneficial to the cognitive development of school children (Dadvand et al., 2015). The present study focused on investigating the students' perceptions of the impact of vegetation on psychological pressure, studying awareness, and environmental awareness. However, few studies have researched students' perceptions of the impact of vegetation before.

2.3 Knowledge, Attitudes and Behaviours of Environmental literacy

The definition of environmental literacy was coined by Roth (1968) in Massachusetts, and since then, its concept has gradually changed and has been widely examined by many scholars (Morrone et al., 2001; North American Association for EE (NAAEE, 2004; O'Brien, 2007; Roth, 1992; Weiser, 2001). Environmental literacy's most widely accepted meaning contains awareness of and concern regarding the environment and its related items and knowledge, skills, and motivation in order to address problems and avoid new coming (NAAEE, 2004). The framework of early environmental literacy includes components of ecological concepts, problem knowledge, beliefs, values, attitudes, points of limitation, environmental sensitivity, and action strategies (Hungerford, 1985). Scholars synthesise this vast concept into four main components: knowledge, skills, emotions (including environmental sensitivity, values, and attitudes), and behaviours (Roth, 1992). In 2015, NAAEE assessments of environmental literacies (EL) generally considered the main components of ELs in cognitive (knowledge and skills), affective and behavioural domains (NAAEE, 2015) (See Figure 2.1). Programme for International Student Assessment (PISA) (2015) proposed one framework to examine students' environmental literacy (See Figure 2.2). However, in conducting this reported research on students, it mainly referred to three of the NAAEE Environmental Literacy Framework components, namely, environmental knowledge, environmental attitudes, and environmental behaviours, to study and compare students and teachers in green and non-green schools.

In the definition of environmental literacy by the North American Association of Environmental Education (NAAEE) (2015), environmental knowledge, environmental attitudes, and environmental behaviours are the three essential components of environmental literacy. Early scholars have defined environmental knowledge as environmental knowledge for issues and influences and how to act (Hines et al., 1987). With the development of environmental knowledge research, environmental knowledge also has new meanings.

Environmental knowledge includes system, action-related knowledge, and validity knowledge (Kaiser et al., 2008; Roczen et al., 2014).

Attitude refers to people's preferences, what one supports or opposes, and positive or negative perceptions (Petty & Brino, 2010). Environmental attitudes form a person's attitude towards protecting or using the environment, and environmental attitudes may influence subsequent environmental behaviours (Bogner &Wiseman, 2006; Gifford & Sussman, 2012). Pro-environmental attitudes refer to a person's concern for the natural environment (Bamberg, 2003; Hawcroft & Milfont, 2010; Bissing-Olson et al., 2013), reflecting people's general attitudes and perceptions about the ecological environment.

However, there is no clear definition of environmental behaviours. But some scholars have given a rough definition of environmental behaviours: critical behaviours to the environment can be classified from the perspective of intention-oriented or impact-oriented. Classification from the perspective of intent means that behaviours with environmental significance are determined by motivation, and in addition to the classification of these two, it is also possible to distinguish between direct and indirect effects on environmental quality (Stern, 2000). Therefore, Pro-Environmental Behaviour (PEB), also known as green, sustainable, or environmentally friendly (eco-friendly) behaviour, is defined as the behaviour of individuals taking protective actions towards the environment (Krajhanzl, 2010). It includes responsible participation in outdoor activities or recycling household waste and recycling, but it can also respond adaptively to the impacts of climate change, such as purchasing sustainable products, saving water or energy, or changing the way people travel.

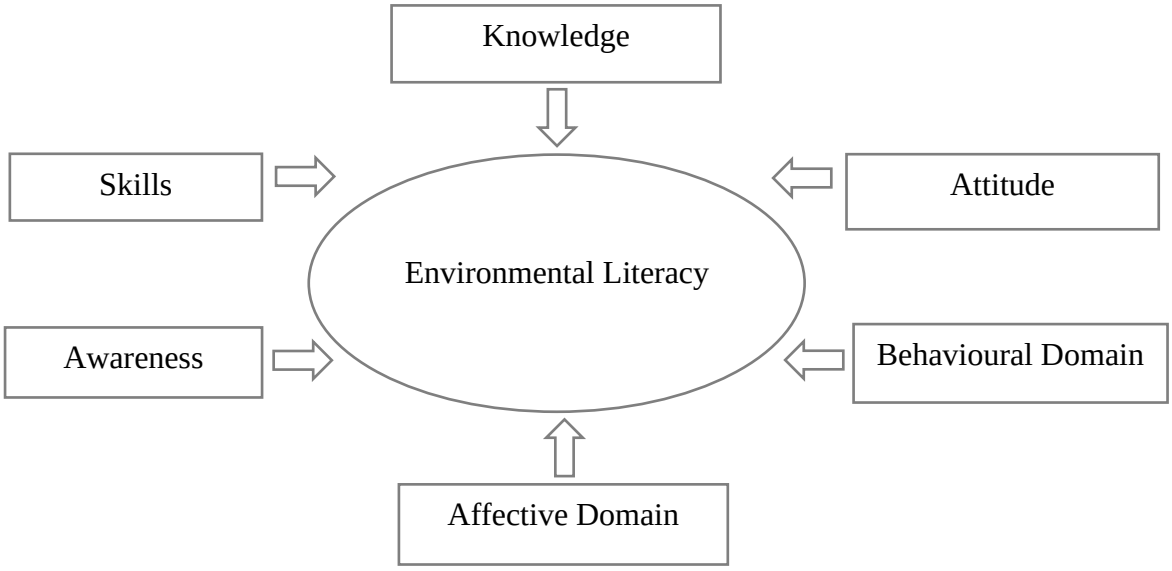

Figure 2.1

The Components of Environmental Literacy (NAAEE, 2015).

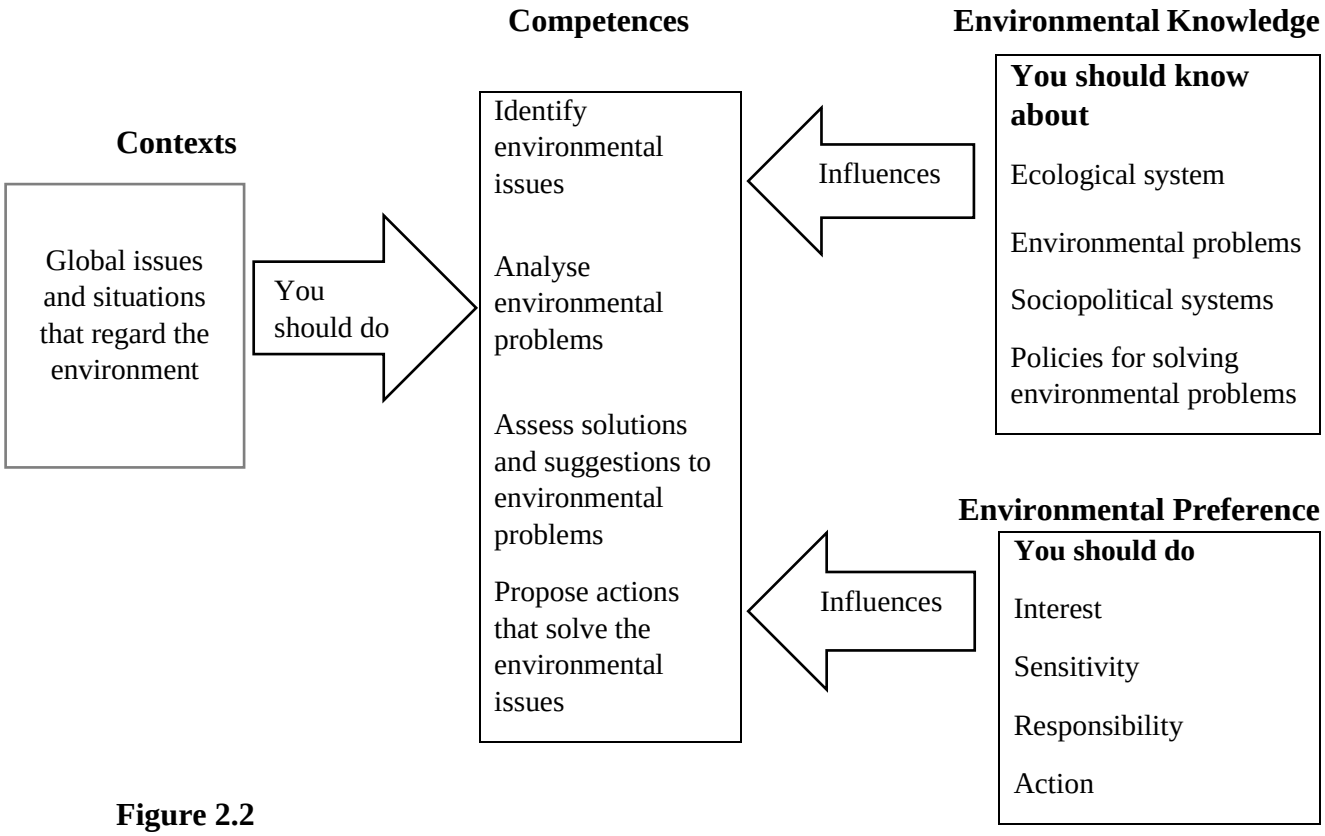

Figure 2.2

The Framework for Assessing Environmental literacy in the PISA (PISA, 2015).

Earlier studies tended to put forward a linear correlation between environmental attitudes and behaviours. Environmental attitudes determine environmental behaviours, leading to environmental behaviours toward protecting the environment. Although these relationships were shown to be oversimplified, they still exist in common sense (Pauw & Petegem, 2011). But many educators still generally believe that requiring people to use a sort of ways to do some behaviours and giving a plausible and understandable explanation will cause that person's behaviours to change (Krnel & Naglic, 2009). There may be a specific relationship between knowledge and behaviours, but some scholars have proposed and proved that relying on knowledge could not make someone take in a particular behaviour (Schultz, 2002; Stern, 2000), But some scholars hold the opposite view, arguing that lack of knowledge may be a hindrance to changing behaviours (DeYoung, 2000; Schultz, 2002). The traditional and inherent *EE model* points out *EE knowledge-attitudes-behaviours* (Liu et al., 2015). It is widely understood and used, that environmental knowledge changes environmental attitudes, and environmental attitudes determine environmental behaviours toward the environment (See Figure 2.3).

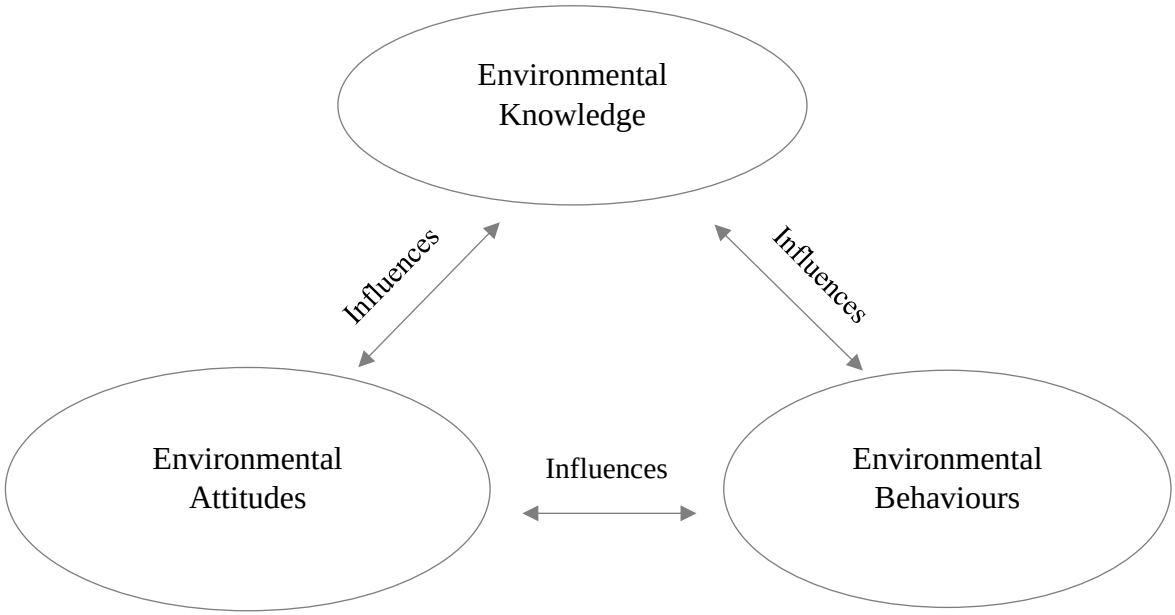

Figure 2.3

Environmental Education Model: EE Knowledge-Attitudes-Behaviours (Liu et al., 2015).

2.3.1 Teacher's Knowledge, Attitudes and Behaviours on Environment

When environmental education was emerging, some scholars had already researched teachers' environmental knowledge, environmental attitudes, and environmental behaviours. Previous studies show Nigerian scholars surveyed local science, arts, and social sciences teachers on environmental knowledge, attitudes, and behaviours. The attitude towards environmental protection is also relatively negative. Many teachers have heard of environmental education but are not conscious of participating in environmental education seminars and various environmental protection activities. It may be concerned with the emerging degree of environmental education (Manasaray et al., 1998). However, some Greek scholars have found that the environmental education received by teachers is not scientific, and there is a certain misunderstanding of their cognition of environmental knowledge (Michail et al., 2007). Research in Malaysia found that teachers are highly concerned about the environment, but they have insufficient understanding of the root causes of environmental problems (Said et al., 2003). Scholars in Lebanon conducted a comparative study on local teachers' environmental knowledge and attitudes in Lebanon and teachers in Australia. The results showed that Australian teachers generally have higher environmental knowledge than Lebanese teachers. Career threshold teachers who have a favourable view of environmentally responsible behaviours tend to support school environmental education (Vlaardingerbroek et al., 2007). There are also studies on the environmental knowledge of biology teachers in middle schools. The results showed that secondary school biology pre-service teachers had better performance towards environmental knowledge. Most teachers had a good understanding of environmental concepts, which may be related to the relevant education and training they received in college (Esa, 2010). Research in Israel of first-year pre-service teachers in pre-K-10 training showed that teachers had the limitation of environmental knowledge, but their attitudes toward the environment are positive. However, these teachers have a lower sense of environmental

responsibility (Pe'er et al., 2007). Some scholars in Taiwan have evaluated teachers' environmental literacy. The research results showed that teachers' attitudes and attitudes are high, while environmental knowledge level is moderate and environmental behaviour is low (Liu et al., 2015).

While primary school teachers in Taiwan outperformed high school teachers in assessment, this may be connected with their teacher environment training (Liu et al., 2015). Two studies from U.S. indicated that pre-service teachers in primary schools lacked sufficient knowledge to be environmentally literate. Therefore, they suggested the need to integrate EE into instructional training programmes effectively (Amirshokoohi, 2010; Desjean-Perrotta et al., 2008). In addition, many studies suggest that pre-service teachers have a moderate attitude towards environmental issues and generally have a higher awareness of environmental issues (Buldur & Ömeroglu, 2018). For example, scholars in Turkey have conducted research on the environmental literacy of science teachers in 34 provinces in 12 sub-regions of the country. N=1,182 teachers have participated in completing a questionnaire on environmental literacy, including knowledge, attitudes, use, and concerns about environmental literacy. With four components, the findings show that 77% of science and technology teachers have enough environmental knowledge, a positive attitude, a high sense of responsibility, and concern for the environment (Kahyaoğlu, 2011). These two previous studies have assessed teachers' environmental literacy, and the results have shown that teachers in primary schools lack sufficient environmental knowledge (Michail & Stamou, 2007; Spiropoulou et al., 2007).

In addition, many scholars have also proposed factors that may have the impact on teachers' environmental attitudes and environmental behaviours, such as age, gender, and parents' knowledge level. Some scholars have proposed that environmental knowledge is influenced by gender, parental education, and knowledge level (Gambro & Switzky, 1999; Kuhlemeier et al.,

1999), while the perception of environmental issues is associated with correct understanding (Dillon & Gayford, 1997). Different studies suggest that the different ways of expressing various factors such as education level, gender, and age are likely to affect teachers' environmental knowledge (Kahyaoğlu, 2011; Ma & Bateson, 1999; Tuncer et al., 2009). While some studies have shown that males are more perceived and sensitive to environmental issues than females (Michail, 2007; Quimbita & Pavel, 1996). Many studies have found the opposite result, arguing that female teachers generally have higher environmental knowledge and attitudes than male teachers (Davidson & Freudenburg, 1996; Larijani, 2010; Tikka et al., 2000). For instance, in a study measuring the environmental literacy of teachers in Malaysia, it was found that teachers are highly concerned about the environment but lack understanding of the root causes of environmental issues. The findings also revealed that teachers' environmental behaviours toward protecting the environment were inconsistent with levels of attention and knowledge, and their participation in nature-related activities was lower (Aini et al., 2009).

2.3.2 Students' Environmental Knowledge, Environmental Attitudes, and Environmental Behaviours

Students are active and vital in the education system, and it is more than just learning what teachers teach; most importantly, finding ways to apply what they have learned outside of the school environment, students should try to reflect the knowledge learned in school into their daily life as much as possible. Current students will have a significant influence on the state of the environment in the future. Therefore, the importance of students in society is undeniable (Lozano, 2006; Waas et al., 2010; Wright, 2007; Zilahy & Huisingh, 2009). Students in the primary and secondary education stages have significant progress. They gradually form their prospect on life and the world are easily influenced by their surroundings. Therefore, green

schools are practical and helpful to fostering students' accurate consciousness on life and values and developing students' psychological health (Qiu, 2003, p. 129). Furthermore, youth can be influenced by environmental issues from current situations, providing them with correct environmental knowledge and skills to put forward suggestions for sustainability (Adomssent et al., 2007; Bradley et al., 1999; Zhang et al., 2010).

Many scholars have evaluated students' environmental literacy in the existing research, especially environmental knowledge, and attitude. Previously, scholars in Singapore conducted an evaluative survey on the environmental knowledge, attitudes, and behaviours of 1,256 students in 9th Grade and junior college (11th Grade) in the country. The average score of students' environmental knowledge was 70.9%, and the environmental attitude and behaviours scores were 66.0% and 70.5% in the upper-middle level. Most students obtain environmental knowledge through social media (Ivy et al., 1998). Dutch scholars studied environmental knowledge, environmental attitudes, and environmental behaviours of students (around 15 years) in the secondary schools across the country. The study results showed that 57% of 9th Grade students had a very positive attitude towards the environment, and 35% of students put extra effort into the environment. However, students' understanding of environmental issues was reported to be sparse and often incorrect.

Similarly, many students under-represented environmental behaviours, and the relationship between environmental knowledge and environmental attitudes and behaviours observed to be small (Kuhlemeier et al., 1999). At the beginning of the development of environmental education in local primary schools, Greek scholars surveyed 686 students in 5th to 6th Grade of primary schools on their environmental knowledge and attitudes, which were mainly influenced by textbooks (Paraskevopoulos et al., 1998). Lebanese scholars have measured environmental knowledge and attitudes among 660 local middle school students in 10th to 11th

Grade. The results showed that the students' environmental attitudes to be very positive, but their understanding of environmental knowledge and concepts was found to still be insufficient; this may be because they have not been exposed to new environmental education for a very long time (Makki et al., 2003). Rickinson (2001) showed that students' knowledge of the actual environment is generally low. Scholars in mainland China conducted a comparative study He et al., 2011) on students' environmental knowledge and attitudes aged 16-20 in Gansu and Shanghai. The study results showed that the students in the two places had good environmental attitudes but lacked environmental knowledge. Comparatively speaking, students in Shanghai were observed that they have much higher degree of environmental knowledge, a more positive attitude towards the environment, and more similaly to act in an environmentally responsible way in the future. In contrast, regional differences were found in environmental knowledge, attitudes, and behaviours levels (He et al., 2011).

Most scholars put forwarded that males are more knowledgeable about environmental problems than females; men are more knowledgeable about the environment than women (Levine & Strube, 2012; NEETF, 1998). Nevertheless, other studies have found mixed results, with girls' environmental attitudes and environmental knowledge to be better than boys' (Coertjens et al., 2010; Duarte, 2017; Pauw & Petegem, 2010; Zelezny et al., 2000). Some studies have also shown that schools can affect students' environmental knowledge and attitudes, and that schools teaching science and environmental courses in more practical ways are connected with higher environmental awareness of students. In contrast, environmental learning activities are associated with more pro-environmental attitudes among students (Coertjens et al., 2010). The mastery of languages other than the native language also impacts students' environmental attitudes (Pauw & Petegem, 2011).

Some scholars (Goldman et al., 2018; Krnel & Naglic, 2009; Meilinda, 2017; Nurwidodo et al., 2020; Spinola, 2015) have also conducted comparative studies on students' environmental literacy in ecological schools and conventional schools. The research results of Krnel and Naglic (2009) showed that the knowledge level of students in ecological schools to be slightly higher than that of students in conventional schools. On the other hand, there was no statistically significant difference between the two groups regarding students' environmental awareness and behaviours. These findings indicated that environmental knowledge does not affect students' attitudes, awareness, and behaviours towards the environment. Portuguese scholars conducted a comparison survey on environmental knowledge, attitudes, and behaviours regarding the environmental literacy of local 9th Grade students in Eco-Schools and ordinary schools. The study results found that the performance of students in Eco-schools was not significantly higher than that of ordinary schools in these three components (Spinola, 2015). Scholars in Indonesia have done many studies on students in the Adiwiyata programme in their country: the environmental literacy of students in green and non-green schools. A 2017 study in Indonesia showed that high school students in the Adiwiyata Green School Project did not show very positive environmental knowledge levels and attitudes (Meilinda, 2017).

In contrast, some scholars measured and compared the environmental literacy of 275 Adiwiyata and non-Adiwiyata students in four local state high schools. The results showed that the Adiwiyata Green School Project could help students improve their environmental literacy (Nurwidodo et al., 2020). Furthermore, scholars in Israel and Belgium also proposed that the development of Eco-schools and green schools has a very positive impact on students' environmental knowledge, attitudes, and other related environmental literacy (Goldman et al., 2018; Özsoy et al., 2012). Promoting the development of green school projects is very beneficial to students' receiving environmental education and deepening their learning of environmental literacy. Scholars from the Netherlands, Slovenia, and Iceland have found that

although students in Eco-schools have significantly better environmental knowledge than students in ordinary schools, they have not found a more upbeat performance in environmental attitudes (Hallfredsdóttir, 2011; Krnel & Naglic, 2009; Pauw & Petegem, 2011).

However, the previous research on teachers' and students' environmental knowledge, pro-environmental attitudes, and pro-environmental behaviours regarding environmental literacy in mainland China is still developing and rare. Therefore, this paper focused on conducting surveys in green schools in Zhengzhou City, Henan Province in mainland China. It mainly examined teachers' and students' environmental knowledge, attitudes toward protecting the environment, and pro-environmental behaviours regarding environmental literacy in 5th and 6th Grade based on the definition of environmental literacy proposed by NAAEE (2015).

2.4 Overview the Research Gap and Research Objectives

2.4.1 Research Gap

As previously mentioned, the present study discovered two main research gaps from previous research:

a) Although previous research focused on the impact of vegetation on students' psychological and physical health and academic performance by using experiments, there is little relevant research to investigate the different perceptions of the impact of vegetation on students in green and non-green schools to examine the implementation of the selection criteria for the vegetation coverage in the green school project by the questionnaire survey.

b) In the research field of environmental literacy, foreign scholars have devoted themselves to the relevant measurement research on the environmental literacy of teachers and students to examine their environmental literacy. However, few relevant studies have compared teachers'

environmental knowledge, attitudes toward protecting the environment, and pro-environmental behaviours in green and non-green schools. Therefore, for the comparison study on these three components as previously mentioned regarding the environmental literacy of teachers and students in green and non-green schools in mainland China, no relevant research has been discovered in previous studies.

2.4.2 Research Objectives

Based on the research of the scholars previously mentioned and the gap in existing studies, green schools were the tool as the primary research background. According to the development of green school movements in mainland China, with the different geographical situations, the selection criteria of the green school project for different regions in mainland China is different. However, the development policy EE in the green school project is the same in every region in mainland China. However, the present study has examined the green school project in Zhengzhou City. Here, the selection criteria for the green school project have been described and studied in detail. Therefore, this study undertook the development policy, selection criteria, and development purpose of the Green School Project in Zhengzhou City of Henan Province was the research baseline in order to conduct a comparative study on students in 5^{th} and 6^{th} Grade and teachers in green and non-green primary schools. Therefore, the present study was divided into three survey parts, and the specific research purposes were as follows:

1) Based on the selection criteria for the green school project in Zhengzhou City, the coverage area on the campus of green schools was regarded as critical hardware. Therefore, the first part aimed to determine students' perceptions of the impact of vegetation in green schools covered by vegetation, including psychological pressure, studying awareness, and environmental awareness.

2) The second part aimed to compare the environmental knowledge, attitudes toward protecting the environment, and pro-environmental behaviours of students in 5th and 6th Grade in green schools and non-green schools regarding the development policy and selection criteria for the green school project in Zhengzhou City. The purpose was to examine the current development of green schools in Zhengzhou City and how they affect students' environmental knowledge, pro-environmental attitudes, and pro-environmental behaviours regarding environmental literacy.

3) The third part aimed to develop a policy for green schools and selection criteria to compare the environmental knowledge, pro-environmental attitudes, and pro-environmental behaviours of teachers responsible for primary schools in green and non-green schools. In addition, it also intended to investigate green schools and how they play a vital role in teachers' environmental literacy.

2.5 Statement of the Research Questions

As mentioned in the introduction section (Introduction, Section 1.2.3) of the present study, the green school project in Zhengzhou City of Henan Province, is based on the development of green school movements in mainland China. Although there are different selection criteria for the green school project depending on the different geographical situations in mainland China, the development policy of the green school project in Zhengzhou City is similar to the green school project in other cities of mainland China. It is mainly based on an environmental education background, establishing more conducive schools for environmental protection, and sustainable development for the environment (Zhengzhou Education Bureau, 2021). As previous studies have proposed, primary education is the vital step of compulsory education, and primary education is the significant stage for cultivating environmental literacy (Cutter & Smith, 2001, 2003). Meanwhile, students are essential and vital in education, and the role of

students in the education system is more than just learning what teachers teach; most importantly, finding ways to apply what they have learned outside of the school environment, students should also accept the knowledge when the students have learned in school to their daily lives. Students will have a significant impact on the condition of the environment in the future, and the importance of students in society is undeniable (Lozano, 2006; Wright, 2007; Zilahy & Waas, 2010). Teachers also play a leading role in education in schools. Teachers play a crucial role in students' learning (Robottom et al., 2000).

Furthermore, environmental literacy is regarded as a practical standard for testing the quality of environmental education, and it also has a crucial impact on the implementation of environmental education (NAAEE, 2015). Based on these theoretical backgrounds, the present study affirmed the significance of environmental education in primary education. Students and teachers are the most critical components of schools and play an evaluation role in developing schools, even green schools. Therefore, this study undertook the green school project at primary schools in Zhengzhou City as the main research background and surveyed teachers and students in 5^{th} and 6^{th} Grade in green and non-green primary schools. Meanwhile, to respond to the current research gap in the relevant research field, the present research mainly addressed the following three questions:

1. Can study in a green school covered with vegetation improve students' perceptions of the positive impact of vegetation?
2. Can the green school project's development policy and selection criteria affect students more positively on their: a) environmental knowledge; b) pro-environmental attitudes; and c) pro-environmental behaviours regarding environmental literacy?
3. Can the green school project's development policy and selection criteria affect teachers' performance on: a) environmental knowledge; b) pro-environmental attitudes; and c) pro-environmental behaviours regarding environmental literacy?

2.6 The Importance and Significance of the Present Research

In recent years, more and more areas in mainland China have devoted themselves to the evolution and implementation of the green school project, and green schools have gradually been widely concerned as an important measure to promote environmental education and education for sustainable development (Zeng, 2004). As a major city in the Central Plains region of mainland China, Zhengzhou City of Henan Province has also made efforts to respond to the development of green schools. Some scholars have already assessed and explored the environmental literacy of students and teachers in the past (Ivy et al., 1998; Kuhlemeier et al., 1999; Liu et al., 2015; Makki et al., 2003; Manasaray et al., 1998; Michail et al., 2007; Paraskevopoulos et al., 1998; Pauw & Petegem, 2011; Pe'er et al., 2007; Said et al., 2003; Vlaardingerbroek et al., 2007), and put forward that vegetation has a good effect on reducing students' psychological pressure and improving their academic performance (Almanza et al., 2012; Astell-Burt et al., 2013; Cochrane et al., 2009; James et al., 2015; Lachowycz & Jones, 2012, 2014; Sallis et al., 2016; Schipperijn et al., 2013). Based on the development policy and selection criteria of the green school project in Zhengzhou City, the present study investigated the environmental literacy of students and teachers in green and non-green schools, including a) environmental knowledge, b) pro-environmental attitudes, and c) pro-environmental behaviours. NAAEE (2015) proposed that environmental literacy is also regarded as the best reflection of the implementation of environmental education. Therefore, examining the environmental literacy of teachers and students could ascertain the situation of implementing the environmental education for the green school project. However, the present research also has made new breakthroughs and explorations based on previous research.

Firstly, the research background was green primary schools in Zhengzhou City of Henan Province, as mentioned above (see 2.3.2), the present study affirmed primary education's significance and investigated students in 5th and 6th Grade. Furthermore, the green school

project in Zhengzhou City must have a specific vegetation area coverage. Based on the selection criteria, a comparative study on the students' perceptions of the impact of vegetation was conducted. Differing from previous studies, the focus of the study was that it explored students' perceptions of the impact of vegetation in green and non-green primary schools in Zhengzhou City of Henan Province in mainland China.

Secondly, it fully affirmed the importance of teachers and students (Lozano, 2006; Than, 2001; Waas et al., 2010; Wright, 2007; Zilahy & Huisingh, 2009) proposed by previous scholars. And it also affirmed that environmental literacy was a good tool to examine the environmental education forwarded by NAAEE (2004). Therefore, a comparative study on the environmental literacy of students and teachers in green and non-green schools (primary schools) in three components, namely, environmental knowledge, environmental attitudes, and environmental behaviours was conducted in the questionnaire survey. This study aimed to compare the performance of students and teachers in green schools and non-green schools in order to examine the implementation of environmental education in the green school project. Although previous scholars have researched the environmental literacy of teachers and students, most of the research on teachers' environmental literacy has been based on overall measurement and evaluation. However, some foreign scholars have compared students' environmental literacy in green and non-green schools (Meilinda, 2017; Nurwidodo et al., 2020; Spinola, 2015), but the studies on students' environmental literacy in green and non-green schools are also rare in mainland China. Therefore, differing from previous studies, the present study conducted a related comparative study in Zhengzhou City of Henan Province in mainland China. It aimed to emphasise and illustrate the positive role of the green school project, including the importance of implementing environmental education by examining students' and teachers' environmental knowledge, attitudes toward protecting the environment, and pro-environmental behaviours in green schools in Zhengzhou City through the research results.

Fourthly, differing from previous research, even previous scholars have conducted some research to examine teachers' environmental literacy (See Section 2.3.1). However, few relevant research studies aimed at making the comparison survey on teachers' environmental literacy. Especially environmental knowledge, attitudes, and behaviours in green and non-green schools. Based on the green school project and to affirm the importance of teachers' environmental literacy, the present study examined teachers' environmental knowledge, attitudes, and behaviours regarding environmental literacy to prove that the implementation of the green school project is conducive.

Finally, the present study filled the current research gap. It also put forward some implementable suggestions for developing the green school project in Zhengzhou City of Henan Province. For example, the green school project can incorporate education for ESD goals without changing the development policy of green schools in mainland China. As proposed by UNESCO (2015), the goals of ESD further strengthen the development of citizens' behavioural capabilities and motivations. ESD emphasises the development of human behavioural capabilities and skills, not just limited to knowledge acquisition and cultivation. ESD development focuses on developing the values and skills of people (Summer et al., 2005). Based on the development goals and concepts of ESD, the green school project in Zhengzhou City in the future can also integrate the development goals of ESD into the project. In addition, the current study provides a particular reference for future scholars to investigate the implementation of the green school project in mainland China.

2.7 Conceptual Framework

The conceptual framework of the present study was created by utilising the results of previous studies and some research gaps that exist. Firstly, the research background was the green school project in Zhengzhou City of Henan Province in mainland China. Based on previous research

results, the natural environment with vegetation can effectively reduce students' pressure, and improve their environmental awareness and academic performance (Almanza et al., 2012; Astell-Burt et al., 2013; Cochrane et al., 2009; James et al., 2015; Lachowycz & Jones, 2012, 2014; Sallis et al., 2016; Schipperijn et al., 2013). Therefore, selection criteria for 'vegetation coverage must reach 37% and above in green schools' was the baseline for this study, compared the perceptions of students in 5th and 6th Grade on the impact of vegetation in green and non-green schools, and aimed to examine the feasibility of the selection criterion. Secondly, according to the results of above-mentioned studies for measuring the environmental literacy of students and teachers (see Sections 2.3.1 and 2.3.2 for more detail), and based on NAAEE (2015) that proposed environmental literacy is a reasonable means to assess the implementation of environmental education, among which, environmental knowledge is the best embodiment of environmental education. The present study aimed to examine the three components of environmental literacy: a) environmental knowledge, b) pro-environmental attitudes, and c) pro-environmental behaviours of teachers and students in green and non-green schools. The purpose was to examine the implementation of EE, a vital component and development policy of the green school project in Zhengzhou City of Henan Province, through a comparative study between green and non-green schools. Finally, based on previous studies, primary education is vital in developing the importance of environmental education (Cutter & Smith, 2001), the importance of primary school students in education (Lozano, 2006; Waas et al., 2010; Wright, 2007; Zilahy & Huisingh, 2009), and the important role teachers play in education (Robottom et al., 2000). Therefore, the present study aimed to survey students and teachers in green and non-green primary schools in Zhengzhou City of Henan Province in order to examine and reveal the implementation of the green school project in primary schools.

The current study was divided into three parts. The first part mainly compared 5th and 6th Grade students' perceptions of the impact of vegetation on psychological pressure, studying their

awareness and environmental awareness in green and non-green schools. The first part mainly examined vital selection criteria for the green school project: the feasibility of vegetation coverage on campus. NAAEE (2015) proposed that environmental awareness is a component of environmental attitudes toward environmental literacy, therefore, investigating students' environmental awareness also paved the way for surveying students' and teachers' environmental literacy. The second part mainly compared 5th and 6th Grade students' environmental knowledge, pro-environmental attitudes, and pro-environmental behaviours in green and non-green schools regarding their environmental literacy. The purpose was to examine the development policy of the green school project in Zhengzhou City and the implementation of environmental education training for students in green schools. The second part played a role in connecting the first and third parts. The third part was to compare teachers' environmental knowledge, pro-environmental attitudes regarding environmental literacy in green and non-green primary schools, and aimed to examine the implementation of environmental education training for teachers. The specific relationship between the three parts is represented in Figure 2.4 as follows:

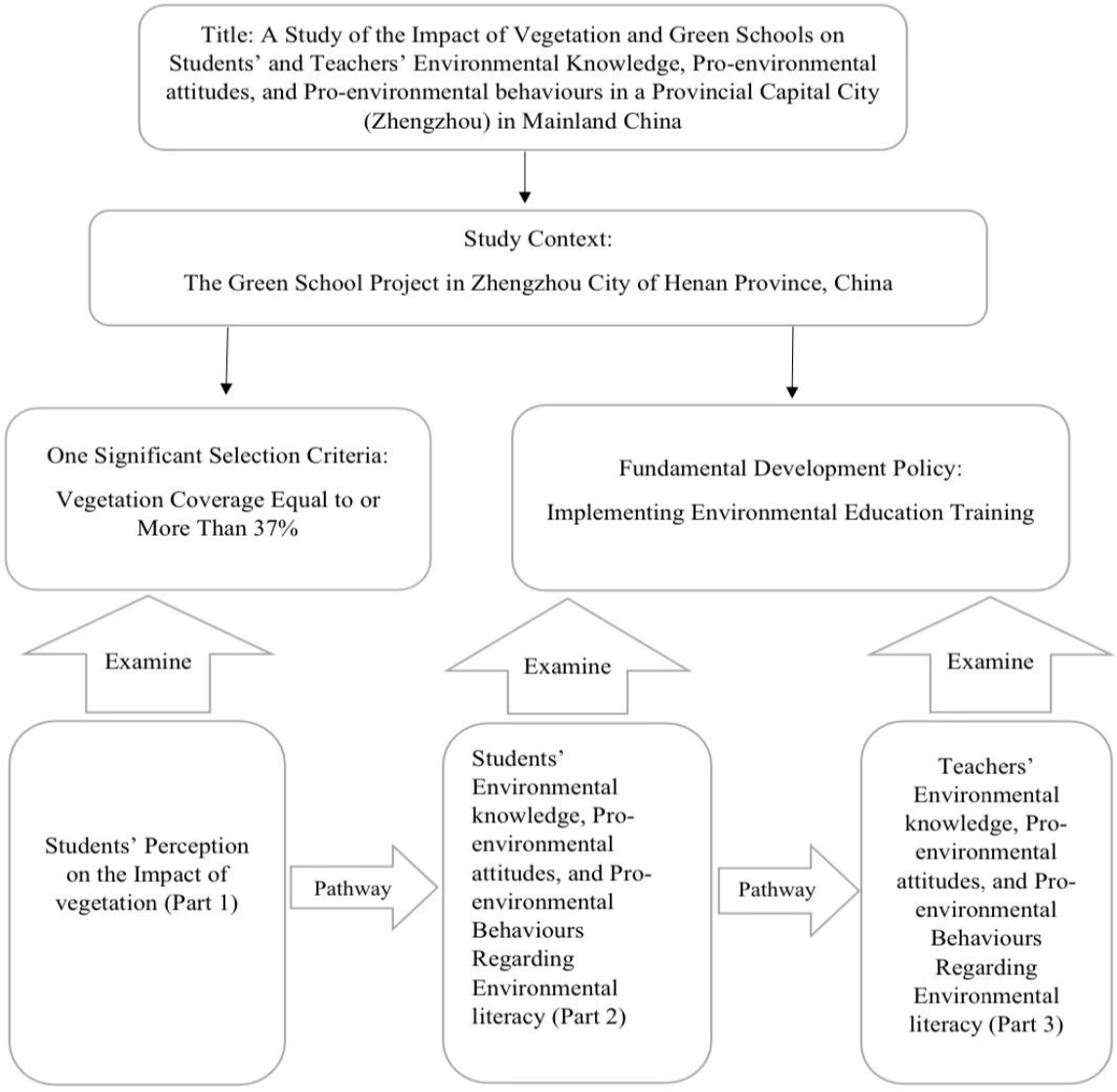

Figure 2.4

Conceptual Framework

Chapter 3

The Students' Perceptions of the Impact of Vegetation on Psychological Pressure, Studying Awareness, and Environmental Awareness (Part 1)

3.1 Introduction

3.1.1 The Impact of Vegetation for the Community

The effects of local landscape and vegetation coverage area on people's health has been widely concerned and studied by many scholars, and more and more studies have put forward the benefits of green space. Research findings put forwarded that interventions that enlarging and enhancing urban green space may promote the positive health, social and environmental outcomes for the whole community, especially among those with lower socioeconomic status (Braucach et al., 2017). Vegetation and green spaces have great benefits for people. Some studies show that vegetation coverage area and landscape can reduce the urban heat island effect, protect against heat-related health hazards, improve social capital and cohesion, and help increase people's willingness to exercise (Villanueva et al., 2015). Growing research studies illustrated that getting exposed to nature and vegetation coverage area can effectively bring about mental recovery and relaxation while avoiding chronic stress and having potential benefits for health problems related to attention fatigue (Hartig, 2007; Hartig et al., 2014). Getting exposed to green spaces decreases neural activity in the sub genicular prefrontal cortex and reduces the appearance of depressive symptoms (Bratman et al., 2015).

Researchers in the U.K. have demonstrated experimentally that getting exposed to vegetation coverage spaces can reduce adults' pressure with living in poor local communities using an innovative research method using circadian cortisol patterns (Beil & Hanes, 2013; Roe et al.,

2013; Ward Thompson et al., 2012). Green spaces and vegetation are also helpful to people's immune systems. Through experimental research, some Japanese scholars have confirmed the association between visiting forests and beneficial immune responses. This indicates that the immune system benefits from direct staying at the natural environment or through getting exposed to green spaces (Li et al., 2008). The human microbiome can improve mental health (Logan, 2015). Green space and vegetation can also enhance people's physical activity and improve their physical fitness. Studies have shown that the quality of urban green space and specific facilities are beneficial for promoting physical activity in the elderly (Aspinall et al., 2010). Mental activity in green spaces may play a role for residents with mental illness (Roe & Aspinall, 2011). Some studies have proposed that using green spaces can increase interest in physical activity and reduce sedentary time among adults, children, and elderly adults (Almanza et al., 2012; Astell-Burt et al., 2013; Cochrane et al., 2009; James et al., 2015; Lachowycz & Jones, 2012, 2014; Sallis et al., 2016; Schipperijn et al., 2013). Mental activities in vegetation coverage area is more restorative to health than mental activities in the environments without green spaces (Barton & Pretty, 2010). Vegetation has also been shown to improve mental health and cognitive function. People who live in places with more green spaces have lower psychological stress and better happiness than those living in less green spaces (White et al., 2013). Instead, planting much vegetation in the community can often effectively reduce depression and anxiety (Beyer et al., 2014; Bratman et al., 2015; Pope et al., 2015). One study in Spain showed that higher vegetation cover at home and in schools were connected with enhanced perceived progress (Dadvand et al., 2015).

3.1.2 The Impact of Vegetation on Students' Psychological Pressure

Nowadays, many scholars have studied the effects of vegetation on reducing people's psychological pressure. Some studies have shown a positive correlation between vegetation

and environmental quality. Green landscape can increase air quality by reducing air pollutions (Yang et al., 2008). Vegetation can also reduce urban air temperature and improve the comfort of the urban environment (Santamouris, 2014). There is growing evidence that exposure to nature is beneficial for physical and mental health (Berman et al., 2012; Herzele & Vries, 2012; Maas et al., 2009; Twohig-Bennett & Jones, 2018; White et al., 2013; Wu et al., 2018).

People are paying more and more attention to the potential role of the natural environment and green plants in human health and well-being. Studies by some scholars have shown that green plants in the natural environment may affect people's health in various ways. These pathways either directly contribute to health and, therefore, have specific benefits, or through, for example, promoting healthy behaviours (such as participating in sports activities), and indirect work (Bowler et al., 2010). Green space can help students enhance physical activity and playability (Barton et al., 2014; Dyment & Bell, 2008). Vegetation can improve students' self-discipline and concentration (Faber & Kuo, 2009; Faber et al., 2002). It can also enhance students' mental health, reduce pressure and improve resilience to the environment (Chawla et al., 2014; Flouri et al., 2014), and can effectively improve students' environmental awareness (Cheng & Monroe, 2012; Collado et al., 2013; Wells & Lekies, 2006). Scholars have also researched the impact of vegetation on students' recovery of physical fatigue and pressure. They surveyed a randomised controlled experiment on high school students. Students were randomly arranged to classrooms with no windows or windows leading to architectural spaces or spaces covered with green vegetation. The participants were arranged to study and rest in different classrooms. The experimental research results showed that the vegetation coverage area is very helpful for students to recover from pressure experiences. However, the study found no evidence that pressure modulates the correlation between vegetation coverage area and attention recovery, suggesting two different pathways that affect students' psychological and percieved function (Li & Sullivan, 2016). Spanish scholars conducted a 12-month study

on 2,630 students from 2nd to 4th Grade in 36 primary schools in Barcelona to study whether students can improve their cognition and development through vegetation and spaces covered by green vegetation. The result showed a beneficial link between exposure to green space and the cognition and development of primary school students. This is partly caused by the large amount of vegetation planted in schools that can absorb harmful gases and reduce air pollution (Amoly et al., 2014). Secondary school landscape modifications that improve the amount of vegetation are associated with lower pressure levels and better mental health in a quasi-experimental study (Kelz et al., 2013).

3.1.3 The Impact of Vegetation on Students' Academic Performance

Recently, a growing number of evidence has revealed the relationship between students' classroom performance and surrounding green vegetation. With the development of research in the field of the impact of vegetation on students, studies by scholars have also shown that the increase in tree coverage is also significantly positively correlated with the improvement of students' reading test scores (Hodson & Sander, 2017). Benfield (2015) have put forwarded that enough vegetation coverage at campus can improve students' learning interests and achievements. In the United States, scholars used the Twin Cities metropolitan area of Minnesota as a case study area to explore the relationship between local natural environment and the studying awareness of local schools. They used regression analysis to determine the relationship between environmental variables (i.e., tree cover, vegetation cover, water cover) inside and outside the school campus, as well as four measures of population-level third grade reading level and math success rate to illustrate vegetation cover whether it can affect reading level and mathematics. The study results found an obvious positive relationship between tree coverage and reading performance, which indicated that initiatives aimed at enhancing tree coverage in student environments can improve academic progress (Hodson & Sander, 2017).

More and more scholars in the United States have been working on green vegetation's positive impact on students. In 2010, Matsuoka's research showed that the abundance of vegetation on school campuses was positively associated with the academic performance of Michigan 9th graders, with higher vegetation coverage associated with better student achievement (Matsuoka, 2010). A study using GIS technology and aerial photographs to classify landscapes into servals found a positive correlation between trees and student test scores (Kweon, 2017). Leung et al. (2019) discovered that the students getting exposure in the high vegetation coverage campus can significantly improve their English and Mathematics achievement. Tree cover has a significant impact on children's learning achievements, and local school districts can enhance children's learning awareness by improving tree coverage (Sivarajah et al., 2018). Some scholars have also researched the relationship between vegetation reducing students' psychological pressure and improving classroom performance. Previous scholars' research on students exposed to a green environment shows that the amount of vegetation in and around a campus significantly predicted school-wide student performance (i.e., standardised test scores, graduation rates) (Matsuoka, 2010; Wu et al., 2014). Exposure to the green environment in the outdoors is very beneficial to the cognitive development of school children (Dadvand et al., 2015). However, few studies have researched the impact of vegetation on students' psychological pressure and the perception of studies and environmental awareness in green schools.

In the provincial capital city Zhengzhou, there are three levels of Green School: i) national-level, ii) provincial-level, and iii) municipal-level. The researcher mainly investigated the provincial-level and municipal-level green schools in Zhengzhou City. Municipal-level green schools' selection criteria are the basis for provincial-level green schools. Therefore, the schools that intend to compete for provincial-level green schools must first be municipal-level green schools. However, based on the development of municipal-level green schools,

provincial-level green schools are more focused on implementing and evaluating environmental education in schools (Henan Education Bureau, 2020). According to the only selection criteria of the green infrastructure of the green school project in Zhengzhou City: (the vegetation coverage rate must be equal to or higher than 37%), the present study aimed to i) explore the selection criteria is effective for students' perceptions of the impact of vegetation on reducing psychological pressure, improving studying awareness, and environmental awareness, a comparative study was made to compare students from green and non-green schools; and ii) investigate students' different performances in provincial-level and municipal-level green schools or in different non-green schools, comparative studies have been made between different types of schools. Furthermore, the present study discussed the linear correlation between students' perceptions of the impact of vegetation on reducing their psychological pressure and improving studying awareness and environmental awareness.

3.2 Methodology and Instrument

3.2.1 Methodology

The present study mainly used the quantitative research method to conduct the research. Quantitative research is a systematic investigation of phenomena by collecting quantifiable data and performing statistical, mathematical, or computational techniques. This part of the research mainly used the form of a questionnaire survey to measure the perceptions on the vegetation on reducing psychological pressure and improving the studying and environmental awareness of the students. The results of quantitative analysis were used to compare the differences between students in green schools and non-green schools.

3.2.2 Instrument

The present study utilised a questionnaire survey to measure students' perceptions. The questionnaire had a total of 16 viewpoints and was named 'The Students' Perceptions on the Impact of Vegetation. It measured the students' perceptions on the impact of vegetation on reducing psychological pressure and improving students' studying awareness and environmental awareness. The content of the questionnaire was mainly based on research undertaken by Hodson and Sander (2017) on the impact of vegetation on students' psychological pressure; Li and Sullian (2016) extracted it from a review of students' learning in a green environment that can help to reduce students' physical and mental pressure; Matthew's (2015) review of previous scholars on vegetation can improve students' academic performance; and Cheng and Monroe (2012) conducted research on improving student' environmental awareness. For better adapting to the students' understanding of the questions in the questionnaire at 5th and 6th Grade in the studied city in mainland China, the researcher combined the previous studies and made some adjustments to the questionnaire content for this study. The questionnaire was divided from 16 viewpoints into 3 sections in order to measure the different perceptions of the impact of green vegetation: i) Section A was for the impact of vegetation on psychological pressure; ii) Section B for the impact of vegetation on the studying awareness; and iii) Section C for the impact of vegetation on environmental awareness.

To ensure the students could answer the questions effectively, the questionnaire was made positive and negative adjustments were made to some of the questions. To further ensure the feasibility and reliability of the questionnaire, the current study conducted a certain range of a Pilot Test on the overall 16 viewpoints of the questionnaire before starting the survey. The researcher selected 20 primary school students from 5th and 6th Grade in the research place for the Pilot Test, and the result of the reliability was Cronbach α = 0.83. It proved that this questionnaire could be used effectively.

The final total of 16 viewpoints used a Likert scale to design answers which ranged from ‘Strongly Disagree (1)’; ‘Disagree (2)’; ‘Neutral (3)’; ‘Agree (4)’ to ‘Strongly Agree (5)’. The content of the questionnaire is presented in Appendix 1: Chapter 3 (Part 1).

3.3 Sample and Procedure

The current study collected questionnaire data through online links and a paper version. To distinguish and facilitate the final statistics, the students attending green schools uniformly used the online link questionnaire for completion. Among them, the teachers of the participating classes cooperated and supervised the students to complete all the contents of the questionnaire. In contrast, students in non-green schools arranged to take a paper version of the questionnaire, which was completed in classes and supervised by the class teachers.

The researcher first determined the types of schools and selected four green schools, including two provincial-level green schools and two municipal-level green schools. Meanwhile, the present study also identified four non-green schools at the same level. 5^{th} and 6^{th} Grade were selected from each school and two classes were randomly selected for each grade, and $N = 20$ students were randomly selected from each class. Finally, a total of $N = 80$ students from each school were determined to complete the questionnaire survey. In the end, the total number of people who participated in the questionnaire survey in the four green schools was $N = 330$; the total number of students in the 5^{th} Grade of the four green schools was $N = 160$; and the total number of students in the 6^{th} Grade was $N = 170$. Because green schools’ students were required to complete the online link questionnaire survey under the supervision and guidance of the teacher, questionnaire surveys were conducted in the classroom during science class. In the end, $N = 160$ students in the 5^{th} Grade completed the online questionnaire. However, $N = 7$ of the students in the 6^{th} Grade did not complete the questionnaire (most of the questions were not

answered or they forgot to click to submit online). The final total number of participants in the four green schools participating in the questionnaire survey was N = 323, including N = 160 in the 5th Grade and N = 163 in the 6th Grade.

The four non-green schools used the paper version questionnaires. The total number of people who participated in the questionnaire survey was N = 334, of which, the total number of students in the 5th Grade was N = 164, and the total number of students in the 6th Grade was N = 170. They were required to complete the paper version questionnaires in class. Because the questionnaires were conducted in the school's science experiment class as a course content, all students were required to complete the survey under the guidance and supervision of the teacher. Finally, N = 4 students in non-green schools of the 5th Grade did not complete the questionnaire for various reasons (for example, they did not complete the answer sheet or left halfway), and N = 10 students of the 6th Grade did not complete the questionnaire content (for example, they did not complete the answer sheet or left halfway). The remaining students carefully completed the first part of the questionnaire under the guidance of their teacher. In the end, the total number of students who completed the questionnaire in non-green schools was N = 320, including N = 160 in the 5th Grade and N = 160 in the 6th Grade. The following Table 3.1 presents the total number of participants who eventually participated in the current study:

Table 3.1
Sample Characteristics

School Type	School Number	Classes	Participants	Total Participants
Green Schools	4	5th 6th	160 163	323
Non-Green Schools	4	5th 6th	160 160	320

3.4 Statistical Analysis

SPSS Version 26 was used for the data analysis: a) *t-test* to compare students' perceptions on the impact of vegetation between green and non-green schools, provincial-level green schools, or municipal-level green schools; b) One-Way ANOVA analysis to examine students' perceptions of the impact of vegetation from different non-green schools; and c) Pearson correlation to discuss the correlation between the impact of vegetation on psychological pressure and studying awareness, psychological pressure and environmental awareness, or studying awareness and environmental awareness.

3.5 Results

3.5.1 The Effects of the Students' Perceptions of Vegetation on Psychological Pressure, Studying Awareness, and Environmental Awareness

Table 3.2 describes the average score in green and non-green schools. It contains the overall mean score and the mean score of each viewpoint of students from green and non-green schools about the perception of the impact of the vegetation on psychological pressure, studying awareness, and environmental awareness. Therefore, the table demonstrates that the overall average score of students in green schools (mean = 4.30) is higher than the students in non-green schools (mean = 3.80).

Table 3.2

The Mean Score about the Students' Perceptions on Vegetation Impact on Students' Perceptions on Psychological Pressure, Studying Awareness, and Environmental Awareness in Green and Non-green Schools

Item	N	Mean	School Type	N	Mean
Section A	**Vegetation on Students' Perceptions on Psychological Pressure**				
Q1	643	4.05	Green School	323	4.44
			Non-Green School	320	3.65
Q2	643	3.92	Green School	323	4.37
			Non-Green School	320	3.47
Q3	643	3.95	Green School	323	4.10
			Non-Green School	320	3.79
Q4	643	4.17	Green School	323	4.55
			Non-Green School	320	3.78
Sub-total	643	4.02	Green School	323	4.36
			Non-Green School	320	3.68
Section B	**Vegetation on Students' Perceptions on Studying Awareness**				
Q5	643	4.16	Green School	323	4.37
			Non-Green School	320	3.94
Q6	643	4.10	Green School	323	4.47
			Non-Green School	320	3.73
Q7	643	4.05	Green School	323	4.36
			Non-Green School	320	3.74
Q8	643	4.03	Green School	323	4.16
			Non-Green School	320	3.90
Sub-total	643	4.09	Green School	323	4.34
			Non-Green School	320	3.83
Section C	**Vegetation on Students' Perceptions on Environmental Awareness**				
Q9	643	4.00	Green School	323	4.13
			Non-Green School	320	3.86
Q10	643	4.04	Green School	323	4.43
			Non-Green School	320	3.65
Q11	643	4.14	Green School	323	4.45
			Non-Green School	320	3.82
Q12	643	4.00	Green School	323	4.28
			Non-Green School	320	3.71
Q13	643	3.70	Green School	323	3.40
			Non-Green School	320	3.99
Q14	643	4.22	Green School	323	4.33
			Non-Green School	320	4.11
Q15	643	4.16	Green School	323	4.51
			Non-Green School	320	3.81
Q16	643	4.23	Green School	323	4.58
			Non-Green School	320	3.88
Sub-total	643	4.06	Green School	323	4.26
			Non-Green School	320	3.85
Overall	643	4.05	Green School	323	4.30
			Non-Green School	320	3.80

It firstly investigated students' perceptions on the impact of vegetation in green and non-green schools. A comparative study of students on the perception of the impact of vegetation on reducing students' psychological pressure, improving students' studying awareness, and environmental awareness in 5th and 6th Grade has been conducted. Among them, the questionnaire content was divided into three specific sections.

Table 3.3 illustrates the mean scores of all viewpoints presented in Section A (vegetation on psychological pressure) was mean = 4.36 and mean = 3.68 for green and non-green schools, respectively; mean = 4.34 and mean = 3.83 for green and non-green schools in Section B (vegetation on environmental awareness); mean = 4.26 and mean = 3.85 for green and non-green schools in Section C (vegetation on environmental awareness). There was significant difference between students in green and non-green schools ($p < 0.001$). Furthermore, for the total average score for green (mean = 4.30) and non-green schools (mean = 3.80), the result also showed significant difference ($p < 0.001$) on these 16 viewpoints between these two different types of schools.

Table 3.3
Students' Perceptions on the Impact of Vegetation on Psychological Pressure, Studying Awareness, and Environmental Awareness in Green and Non-green Schools

Section A	**Vegetation on Students' Perceptions on Psychological Pressure**					
Item	**School Type**	**N**	**Mean**	**SD**	**F**	***p-value**
Q1	Green School	323	4.44	0.692	36.875	< 0.001***
	Non-Green School	320	3.69	1.018		
Q2	Green School	323	4.37	0.625	74.011	< 0.001***
	Non-Green School	320	3.47	1.023		
Q3	Green School	323	4.10	0.637	78.104	< 0.001***
	Non-Green School	320	3.79	0.975		
Q4	Green School	323	4.55	0.651	48.547	< 0.001***
	Non-Green School	320	3.78	1.074		
Sub-total	Green School	323	4.36	0.385	237.930	< 0.001***
	Non-Green School	320	3.68	0.941		
Section B	**Vegetation on Students' Perceptions on Studying Awareness**					
Q5	Green School	323	4.37	0.629	24.533	< 0.001***
	Non-Green School	320	3.94	0.986		
Q6	Green School	323	4.47	0.667	39.796	< 0.001***
	Non-Green School	320	3.73	1.015		

Q7	Green School	323	4.36	0.656	36.736	< 0.001***
	Non-Green School	320	3.74	0.905		
Q8	Green School	323	4.16	0.560	105.618	< 0.001***
	Non-Green School	320	3.90	1.114		
Sub-total	Green School	323	4.34	0.410	138.657	< 0.001***
	Non-Green School	320	3.83	0.912		
Section C	**Vegetation on Students' Perceptions on Environmental Awareness**					
Q9	Green School	323	4.13	0.628	52.624	< 0.001***
	Non-Green School	320	3.86	1.028		
Q10	Green School	323	4.43	0.644	60.259	< 0.001***
	Non-Green School	320	3.65	1.015		
Q11	Green School	323	4.45	0.660	12.455	< 0.001***
	Non-Green School	320	3.82	0.984		
Q12	Green School	323	4.28	0.677	93.538	< 0.001***
	Non-Green School	320	3.71	1.144		
Q13	Green School	323	3.40	1.104	28.878	< 0.001***
	Non-Green School	320	3.99	0.945		
Q14	Green School	323	4.33	0.561	16.997	< 0.001***
	Non-Green School	320	4.11	0.860		
Q15	Green School	323	4.51	0.676	29.676	< 0.001***
	Non-Green School	320	3.81	1.004		
Q16	Green School	323	4.58	0.657	56.509	< 0.001***
	Non-Green School	320	3.88	0.996		
Sub-total	Green School	323	4.26	0.368	153.705	< 0.001***
	Non-Green School	320	3.85	0.881		
Overall Total	Green School	323	4.30	0.345	214.225	< 0.001***
	Non-Green School	320	3.80	0.886		

*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$

3.5.2 Students' Perceptions of the Impact of Vegetation on Psychological Pressure, Studying Awareness, and Environmental Awareness in Provincial-level and Municipal-level Green Schools

To further explore the differences between $N = 160$ students in provincial-level and $N = 163$ students in municipal-level green schools, *t-test* analysis was used to investigate students from provincial-level and municipal-level green schools.

Table 3.4 illustrates that students in municipal-level green schools have a significantly better performance in the viewpoints presented in Section A Vegetation on Students' Psychological Pressure ($p < 0.001$), Section B Vegetation on Students' Studying Awareness ($p < 0.05$), and

Section C Vegetation on Students' Environmental Awareness ($p < 0.001$) than students in provincial-level green schools.

Table 3.4

The Impact of Vegetation on Students' Perceptions on Psychological Pressure, Studying Awareness, and Environmental Awareness in Different Types of Green Schools

Section A The impact of Vegetation on Students' Perceptions on Psychological Pressure						
Item	**School Type**	**N**	**Mean**	**SD**	**F**	***p*-value**
Q1	Provincial-level Green School	160	4.36	0.788	8.258	0.035*
	Municipal-level Green School	163	4.52	0.572		
Q2	Provincial-level Green School	160	4.29	0.688	2.215	0.032*
	Municipal-level Green School	163	4.44	0.547		
Q3	Provincial-level Green School	160	4.02	0.705	0.025	0.018*
	Municipal-level Green School	163	4.19	0.552		
Q4	Provincial-level Green School	160	4.44	0.733	10.880	0.003**
	Municipal-level Green School	163	4.66	0.538		
Sub-total	Provincial-level Green School	160	4.28	0.458	28.626	< 0.001***
	Municipal-level Green School	163	4.45	0.270		
Section B Awareness	**The Impact of Vegetation on Students' Perceptions on Studying**					
Q5	Provincial-level Green School	160	4.39	0.673	3.215	0.535
	Municipal-level Green School	163	4.34	0.583		
Q6	Provincial-level Green School	160	4.39	0.752	4.225	0.023*
	Municipal-level Green School	163	4.56	0.558		
Q7	Provincial-level Green School	160	4.25	0.709	0.000	0.004**
	Municipal-level Green School	163	4.46	0.582		
Q8	Provincial-level Green School	160	4.11	0.610	0.272	0.111
	Municipal-level Green School	163	4.21	0.503		

Sub-total	Provincial-level Green School	160	4.28	0.479	2.490	0.017*
	Municipal-level Green School	163	4.39	0.319		
Section C The Impact of Vegetation on Students' Perceptions on Environmental Awareness						
Q9	Provincial-level Green School	160	4.09	0.648	0.508	0.248
	Municipal-level Green School	163	4.17	0.606		
Q10	Provincial-level Green School	160	4.39	0.692	0.468	0.386
	Municipal-level Green School	163	4.46	0.592		
Q11	Provincial-level Green School	160	4.46	0.743	4.337	0.673
	Municipal-level Green School	163	4.43	0.568		
Q12	Provincial-level Green School	160	4.24	0.740	0.810	0.284
	Municipal-level Green School	163	4.32	0.608		
Q13	Provincial-level Green School	160	2.98	1.179	103.938	< 0.001***
	Municipal-level Green School	163	3.82	0.838		
Q14	Provincial-level Green School	160	4.34	0.625	8.233	0.619
	Municipal-level Green School	163	4.31	0.491		
Q15	Provincial-level Green School	160	4.39	0.777	8.300	0.002**
	Municipal-level Green School	163	4.63	0.535		
Q16	Provincial-level Green School	160	4.52	0.735	6.367	0.089
	Municipal-level Green School	163	4.64	0.565		
Sub-total	Provincial-level Green School	160	4.18	0.448	6.698	< 0.001***
	Municipal-level Green School	163	4.35	0.239		

*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$

3.5.3 Students' Perceptions on the Impact of Vegetation on Psychological Pressure, Studying Awareness, and Environmental Awareness in Different Non-Green Schools

One-Way ANOVA analysis was used to explore students' perceptions on the impact of vegetation in four non-green schools, namely, School A (N = 80), School B (N = 80), School C (N = 80), and School D (N = 80).

Table 3.5 demonstrates that there was a significant difference between School A, School B, School C, and School D on the viewpoints presented in Section A Vegetation on Students' Perception on Psychological Pressure ($p < 0.001$), Section B Vegetation on Students' Perception on Studying Awareness ($p < 0.001$), and Section C Vegetation on Students' Perception on Environmental Awareness ($p < 0.001$).

From the average score, students in School D were found to have the best performance on viewpoints presented in Section A (mean = 4.45), Section B (mean = 4.69), and Section C (mean = 4.65) than students in School C (mean = 4.03 in Section A, mean = 4.00 in Section B, and mean = 4.11 in Section C), School B (mean = 3.43 in Section A, mean = 3.71 in Section B, and mean = 3.68 in Section C), and School A (mean = 2.70 in Section A, mean = 2.80 in Section, and mean = 2.83 in Section C).

Table 3.5

The Impact of Vegetation on Students' Perceptions on Psychological Pressure, Studying Awareness, and Environmental Awareness in Different Non-Green Schools

Section A Vegetation on Students' Perceptions on Psychological Pressure					
School Name	**N**	**Mean**	**Std. Deviation**	**F**	**Sig.**
School A	80	2.70 d	1.088		
School B	80	3.43 c	0.571		
School C	80	4.03 b	0.369	100.312	< 0.001***
School D	80	4.45 a	0.441		
Total	320	3.65 c	0.943		
Section B Vegetation on Students' Perceptions on Studying Awareness					
School Name	**N**	**Mean**	**Std. Deviation**	**F**	**Sig.**
School A	80	2.80 d	0.909		
School B	80	3.71 c	0.511		
School C	80	4.00 b	0.357	124.121	< 0.001***
School D	80	4.69 a	0.605		
Total	320	3.80 c	0.924		
Section C Vegetation on Students' Perceptions on Environmental Awareness					
School	**N**	**Mean**	**Std. Deviation**	**F**	**Sig.**
School A	80	2.83 d	0.963		
School B	80	3.68 c	0.412		
School C	80	4.11 b	0.305	130.479	< 0.001***
School D	80	4.65 a	0.500		
Total	320	3.82 c	0.893		

***$p < 0.001$

For four different non-green schools, the same marked letter represents students in four schools have no significant difference in the performance of the impact of vegetation on students' perceptions on psychological pressure (Section A), studying awareness (Section B), and environmental awareness (Section C). However, different marked letters indicate a significant difference between School A, School B, School C, and School D in the above-mentioned sections at the level of $p < 0.05$.

3.6 Discussion

3.6.1 The Comparison of the Students' Perceptions on Vegetation's Impact on Psychological Pressure, Studying Awareness, and Environmental Awareness

The present study mainly used the method of a questionnaire survey to investigate the students' perception on the impact of vegetation on reducing psychological pressure, improving studying awareness, and environmental awareness in 5th and 6th Grade in Zhengzhou City of Henan Province in mainland China. However, differing from previous studies, the present study aimed

to investigate students' perception on the impact of green vegetation. Few scholars have researched the students' perception of green vegetation's impact on reducing psychological pressure and improving their studying and environmental awareness. The finding of the current study was that the students' perception on the impact of vegetation in green schools was significantly higher ($p < 0.001$) than in non-green schools. The result should be argued that it related to the selection criteria with equal to or more than 37% vegetation coverage on campus for the green school project in Zhengzhou City. Learning in green schools can make students exposed to environmental education and touch more green vegetation, but students in non-green schools lack enough vegetation and relevant environmental education. Therefore, this statement is consistent with Hosonson and Sander's (2017) research that the increase in tree coverage can effectively improve student performance, and vegetation can also enhance students' mental health, reduce pressure, and improve resilience to the environment (Corraliza & Collado, 2011; Chawla et al., 2014; Flouri et al., 2014). The following studies also support the results of the current study, and these studies proposed the positive correlation between canopy cover and vegetation and various measures of academic achievement. This association may be due to increased recovery from pressure and physical fatigue caused by exposure to nature (Berman et al., 2008; Berto et al., 2010; Hauru et al., 2012; Lee et al., 2014; Peschardt & Stigsdotter, 2013; Tsunetsugu et al., 2013; Tyrväinen et al., 2014). The experimental research results show that the green landscape is conducive for students to recover from pressure experience (Li & Sullivan, 2016). The preset study also proposes that students can better perceive green vegetation's impact on improving their studying awareness by studying with enough vegetation coverage. This result is similar to previous scholars' research that higher exposure to the green environment may improve a higher academic performance level (Matsuoka, 2010; Wu et al., 2014), and vegetation coverage at campus enhances academic achievement (Benfield et al., 2015; Hodson & Sander, 2017; Kweon et al., 2017; Leung et al.,

2019; Li et al., 2019; Pascoe & Wyatt-Smith, 2013; Tallis et al., 2018; Wu et al., 2014). Furthermore, abundant tree cover significantly affects children's academic performance (Sivarajah et al., 2018). Getting exposed to the vegetation surroundings outside is also beneficial to schoolchildren's cognitive development (Dadvand et al., 2015). The findings also mentioned that vegetation could improve students' environmental awareness, which is consistent with previous scholars' (Chawla, 2009; Cheng & Monroe, 2012; Collado et al., 2013; Wells & Lekies, 2006). These research results reinforce the significance of green vegetation's beneficial impact on students.

3.6.1.1 Students' Perceptions on the Impact of Vegetation on Psychological Pressure, Studying Awareness, and Environmental Awareness in Green and Non-Green Schools

The previous studies did not research the impact of vegetation on students in provincial-level green schools and municipal-level green schools in mainland China. This research argued the reason for the research result. First, the perceptions of students on the impact of vegetation can reduce psychological pressure (Section A) and improve their studying awareness (Section B), and environmental awareness (Section C) in municipal-level green schools is significantly higher than in provincial-level green schools ($p < 0.001$). It may be because municipal-level green schools intend to compete to be provincial-level green schools. Therefore, in the development of green schools, more emphasis will be placed on the construction of schools and the training of students, and all aspects of school construction will be improved for participating in the selection competition of provincial-level green schools. Second, the selection criteria of provincial-level green schools and municipal-level green schools are not affected by the teaching level of schools, and the teaching level and teaching quality of municipal-level green schools may be higher than those of provincial-level green schools. The effects of teaching level and teaching quality may also make students in municipal-level green schools have a more upbeat performance of those items. Finally, although green schools have

specific criteria for vegetation coverage, some municipal-level green schools are in remote locations and have much larger campuses due to the different geographical locations of schools, and the vegetation coverage area is more extensive than provincial-level green schools. Therefore, the students' perceptions of the impact of vegetation can be affected.

For non-green schools, it can be observed that students in School D were the most positive on the items presented in Section A, Section B, and Section C than School C, School B, and School A ($p < 0.001$). According to the understanding of this circumstance, School D is preparing to be selected as a municipal-green school, and the vegetation coverage in this school was the selection criteria. Therefore, students' perceptions can be affected by this situation. However, there are no limitations and vegetation coverage requirements for non-green schools. It can be argued that different teaching quality and teaching levels can be the reason to affect students in School C, School B, and School A. Therefore, students can have better performance with the excellent teaching quality in each school.

3.6.2 The Linear Correlation of the Impact of Vegetation between Psychological Pressure, Studying Awareness, and Environmental Awareness

Few previous studies have explored the correlation between students' perception of the impact of vegetation on reducing psychological pressure, improving the studying awareness, and environmental awareness. The present study found that some scholars have proposed their research found no evidence that pressure modulates the correlation between vegetation landscapes and attention recovery, suggesting that these are two different ways that affect students' psychological and cognitive function (Li & Sullivan, 2016). However, the present study based on students' perceptions to represent and explore the linear correlation between these three sections.

Table 3.6 reveals that the linear correlation between *N=643* students' perceptions of the impact of vegetation on reducing psychological pressure and improving studying awareness *(r = 0.878, p* < 0.001*)*, reducing psychological pressure and improving environmental awareness *(r = 0.900, p* < 0.001*)* or improving studying awareness and environmental awareness *(r = 0.899, p* < 0.001*)* is significant in green and non-green schools.

Table 3.6

The Pearson Correlation of the Impact of Vegetation between Section A Psychological Pressure, Section B Studying Awareness, and Section C Environmental Awareness

Item		Section A Psychological Pressure	Section B Studying Awareness	Section C Environmental Awareness
Section A Psychological Pressure	Pearson Correlation	1	0.878**	0.900**
	Sig. (2-tailed)		< 0.001	< 0.001
Section B Studying Awareness	Pearson Correlation		1	0.899**
	Sig. (2-tailed)			< 0.001
Section C Environmental Awareness	Pearson Correlation			1
	Sig. (2-tailed)			

**. Correlation is significant at the 0.01 level (2-tailed).

Table 3.7 demonstrates that the linear correlation between students' perceptions of the impact of vegetation on reducing psychological pressure and improving studying awareness ($r = 0.719$, $p < 0.001$), reducing psychological pressure and improving environmental awareness ($r = 0.709$, $p < 0.001$), or improving studying awareness and environmental awareness ($r = 0.605$, $p < 0.001$) was significant in green schools.

Table 3.7

The Pearson Correlation of the Impact of Vegetation between Section A Psychological Pressure, Section B Studying Awareness, and Section C Environmental Awareness in Green Schools

Item		Section A Psychological Pressure	Section B Studying Awareness	Section C Environmental Awareness
Section A Psychological Pressure	Pearson Correlation	1	0.719**	0.709**
	Sig. (2-tailed)		< 0.001	< 0.001
Section B Studying Awareness	Pearson Correlation		1	0.605**
	Sig. (2-tailed)			< 0.001
Section C Environmental Awareness	Pearson Correlation			1
	Sig. (2-tailed)			

**. Correlation is significant at the 0.01 level (2-tailed).

Table 3.8 illustrates that the linear correlation between students' perceptions of the impact of vegetation on reducing psychological pressure and improving studying awareness (r = 0.890, p < 0.001), reducing psychological pressure and improving environmental awareness (r = 0.943, p < 0.001), or improving studying awareness and environmental awareness (r = 0.954, p < 0.001) was significant in non-green schools.

Table 3.8

The Pearson Correlation of the Impact of Vegetation between Section A Psychological Pressure, Section B Studying Awareness, and Section C Environmental Awareness in Non-Green Schools

Item		Section A Psychological Pressure	Section B Studying Awareness	Section C Environmental Awareness
Section A Psychological Pressure	Pearson Correlation	1	0.890**	0.943**
	Sig. (2-tailed)		< 0.001	< 0.001
Section B Studying Awareness	Pearson Correlation		1	0.954**
	Sig. (2-tailed)			< 0.001
Section C Environmental Awareness	Pearson Correlation			1
	Sig. (2-tailed)			

**. Correlation is significant at the 0.01 level (2-tailed).

Results show that the Pearson linear correlation between students' perceptions of the impact of vegetation on reducing psychological pressure and improving studying awareness, reducing psychological pressure and improving environmental awareness or improving studying awareness and environmental awareness was significant (p < 0.001) in both green and non-

green schools. The present study argues that schools in the green school project in Zhengzhou City of Henan Province have requirements for the coverage area of vegetation on campus to reach 37% or more (Zhengzhou Education Bureau, 2021). As a result, students can be exposed to a green environment. Therefore, they will have perceptions of the impact of vegetation on reducing their psychological pressure while improving their studying and environmental awareness. On the other hand, although non-green schools do not have mandatory requirements for the coverage area of vegetation on campus, it can be judged from the perceived relationship that students in non-green schools are more inclined and willing to study in a green environment. Meanwhile, students in non-green schools may have a more positive cognitive performance due to the quality of teaching level. These may lead them to agree that vegetation can reduce their psychological pressure while improving their studying and environmental awareness. Therefore, whether it is a green school or a non-green school, it is still necessary to improve the vegetation planting area of the school campus. Furthermore, although this study used a questionnaire survey to examine students' perception of vegetation impact, the correlation results were similar to previous scholars' experimental research, which illustrated that vegetation could effectively reduce students' physical and mental pressure (Berman et al., 2012; Herzele & Vries, 2012; Maas et al., 2009; Li & Sullivan, 2016; Twohig-Bennett & Jones, 2018; White et al., 2013; Wu et al., 2018), improve academic performance (Dadvand et al., 2015; Hodson & Sander, 2017, 2018; Matsuoka, 2010; Wu et al., 2014), and environmental awareness (Chawla, 2009; Cheng & Monroe, 2012; Collado et al., 2013; Wells & Lekies, 2006). Therefore, it shows that students studying under vegetation coverage can effectively reduce their psychological pressure and improve their studying and environmental awareness.

The present study also has some limitations. First, due to the impact of COVID-19, it has certain limitations in data collection. Although this research explored the correlation between students' perceptions of vegetation on reducing psychological pressure, improving their

studying awareness, and environmental awareness, the research method used was a questionnaire. Therefore, this research was limited to studying the correlation between students' cognitive attitudes about the three sections. More intervention experiments are needed for the three major sections to conduct in-depth discussions. Secondly, this research compared the students' perceptions of different schools. It suggests that future research can consider more influencing factors, such as parents' educational level or family pressure may influence children's perception of the impact of vegetation (Desimonen, 1999; Ngai & Cheung, 2000). Finally, the study site was the primary school students in Zhengzhou City to draw the results. However, it may be affected by geography, or that the standards of green schools in different cities will differ, and the results may differ due to different locations.

In addition, compared with previous studies, the present study conducted research on students' perceptions of the vegetation by questionnaire survey. Therefore, it is hoped to provide some ideas for future research in related fields. Meanwhile, the research on green schools in mainland China, even in Zhengzhou City of Henan Province, is still developing. Therefore, the results of this research provide a specific basis for future research on the green school project in mainland China. Finally, it is hoped that more scholars can dedicate themselves to the research on green schools in mainland China in the future.

3.7 Conclusion

The present study investigated the implementation of the green school project's selection criteria for vegetation coverage in Zhengzhou City of Henan Province. It concluded that students in green schools have an obviously higher perception on the impact of vegetation than students in non-green schools ($p < 0.001$). In more detail, students' perceptions in municipal-level green schools were found to be better than in provincial-level green schools ($p <$

0.001). And students in the non-green school (School D), which is preparing to be selected as 'Municipal-level Green School', have the best perceptions on the impact of green vegetation. Furthermore, a significant positive linear correlation between students' perceptions of vegetation on reducing psychological pressure and improving studying awareness ($p < 0.001$), reducing psychological pressure and improving studying awareness ($p < 0.001$), or improving studying awareness and improving environmental awareness ($p < 0.001$) was observed no matter in green or non-green schools.

In summary, green schools should optimally carry out the selection criteria for vegetation coverage in Zhengzhou City of Henan Province. Because a learning environment covered with vegetation can reduce students' physical and mental pressure and improve their academic performance, vegetation can also effectively improve students' environmental awareness. In addition, non-green schools should consider vegetation as a critical component while constructing campus landscape**.**

Chapter 4

Comparison of Students' Knowledge, Attitudes and Behaviours on Environment between Green and Non-Green Schools (Part 2)

4.1 Introduction

4.1.1 Green School Movements in Mainland China

The evolution of the green school movements in mainland China is affected by environmental education (EE) and overseas sustainable education waves (Huang & Lee, 2020, p. 125). In December 1996, the Ministry of Industry and Information Technology, the Ministry of Ecology and Environment, the Central Propaganda Department, and the Ministry of Education issued the "National Environmental Publicity and Education Action Plan (1996-2010)". It first mentioned that by 2000, "Green Schools" existed across the country. The expansion and the progress of green schools in mainland China began in 2000. From 2000 to 2006, environmental education and communication centres in mainland China carried out green school projects in the country, provinces, autonomous regions, and cities. The development of green school projects is one of the important characteristics of promoting environmental education in mainland China (Zeng, 2004). In 2002, the Environmental Education and Communication Center of the Ministry of Environmental Protection compiled the "Green School Guide," which clarified polices, development stages, management guidelines, and evaluation standards for establishing green schools. As of December 31, 2002, there were 13,183 green schools (Ministry of Education of the People's Republic of China, 2003). In 2009, the Environmental Education and Communication Center of the Ministry of Environmental Protection issued a new "Green School Guide," focusing on building ecologically civilised and environmentally friendly schools. After the State Council put forward the "Decision on Implementing the Scientific Outlook on Development and Strengthening Environmental Protection" in 2005, creating green schools has become a voluntary action of many schools. Teachers and students

actively participate in environmental protection activities and contribute to sustainable development (He et al., 2017).

In 2009, the Eco-School Project of the Environmental Education Foundation was recommended in China, and the school began to actively develop Eco-School as a new type of the green school project. As of 2016, more than 3,000 schools have participated in the project's training and exchange activities, and to avoid confusion, "Green Schools" and "Ecological Schools" coexistence with the Green Schools Program in mainland China. On October 18, 2017, the 19th National People's Congress promoted the construction of ecological civilisation and pointed out an obvious procedure for the future green development of China. Green schools are an effective way of EE for adolescents in the current situation (Huang & Lee, 2020, p. 125). Furthermore, the evolution of green schools is practical to the independent progress of primary and secondary school students (Huang & Lee, 2020, p. 125).

In fact, in mainland China, the selection criteria, green school policies, and development speed of the green school project are different in each province and city. However, green schools in mainland China are based on environmental education. The current study mainly investigated the implementation of the green school project in Zhengzhou city, the capital city of Henan Province in the Central Plains region of mainland China. In Zhengzhou City, by the end of 2021 (statistics include universities, secondary schools, primary schools, and kindergartens), more than 300 schools have been the "Municipal-Level Green School," and about 60 schools have been the "Provincial-level Green School." In addition, four schools have been granted with the title of "National-Level Green School." Zhengzhou Green Primary Schools account for 10% of the total. The development goal of the green school project in Zhengzhou City is to fully cooperate the idea of sustainable development into the management of daily life and working based on the schools' realisation of its primary educational function. By carrying out practical environmental education activities, creating a cultural scope of environmental

protection, comprehensively improving the environmental literacy of teachers and students, and allowing teachers and students to develop environmental literacy, including basic knowledge, skills, attitudes, emotions, values, and behaviours for sustainable development in the process of actual participation. However, the selection criteria for municipal-level green schools and provincial-level green schools are similar; when a school reaches the municipal-level green school standard, it can compete with other schools in the province as a provincial green school. Furthermore, compared with municipal-level green schools, provincial-level green schools focus more on implementing and managing environmental education in each municipal-level green school (Henan Education Bureau, 2020).

4.1.2 Environmental Literacy

The term environmental literacy was coined by Roth (1968) in Massachusetts, and since then, its concept has gradually changed and has been widely examined by many scholars (Morrone et al., 2001; North American Association for Environmental Education (NAAEE, 2004; O'Brien, 2007; Roth, 1992; Weiser, 2001). Environmental literacy's most widely accepted meaning includes awareness of and concern for the environment and its related issues and knowledge, skills, and motivation in order to propose solutions for environmental issues (NAAEE, 2004). The framework of early environmental literacy includes components of ecological concepts, problem knowledge, beliefs, values, attitudes, points of control, environmental sensitivity, and action strategies (Hungerford, 1985). Scholars synthesise this vast concept into four main components: knowledge, skills, emotions (including environmental sensitivity, values, and attitudes), and behaviours (Roth, 1992). In 2015, NAAEE assessments of environmental literacies (EL) generally considered the main components of ELs in cognitive (knowledge and skills), affective and behavioural domains (NAAEE, 2015). In conducting this reported research on students, it mainly referred to three of the NAAEE Environmental

Literacy Framework components, namely, environmental knowledge, environmental attitudes, and environmental behaviours, to study and compare students in green and non-green schools.

4.1.3 Students' Environmental Knowledge, Environmental Attitudes, and Environmental Behaviours

Students are vital in the education system, and it is more than just learning what teachers teach; most importantly, finding ways to apply what they have learned outside of the school environment, students should also accept the knowledge that they learned in school to their daily lives. Nowadays, students will have a significant impact on the situation of the environment in the future. Primary and secondary school students are in a critical physical and mental development period. They gradually form their prospect on life and the world and are easily influenced by their surroundings. Therefore, green schools are conducive to fostering students' correct outlook on life and values and are conducive to developing students' physical and mental health (Qiu, 2003). Students will be influenced by environmental issues from the current situation, providing them with correct environmental knowledge and skills to develop sustainable solutions (Adomssent et al., 2007; Bradley et al., 1999; Oguz et al., 2010). Many scholars have evaluated students' environmental literacy in the existing research, especially environmental knowledge and environmental attitude. Previously, scholars in Singapore conducted an evaluative survey on the environmental knowledge, attitudes, and behaviours of 1,256 students in 9th Grade and junior college (11th Grade) in the country. The average score of students' environmental knowledge is 70.9%, and the environmental attitude and behaviours scores are 66.0% and 70.5% in the upper-middle level. Most students obtain environmental knowledge through social media (Ivy et al., 1998). Dutch scholars studied environmental knowledge, environmental attitudes, and environmental behaviours of more than 9,000 students (around 15 years) in 206 secondary schools across the country. The study results

showed that 57% of grade 9th students had a very positive attitude towards the environment, and 35% of students put extra effort into the environment. However, students' perceptions of environmental problems were sparse and often incorrect. Similarly, many students under-represented environmental behaviours, and the relationship between environmental knowledge and environmental attitudes and behaviours proved to be very weak (Kuhlemeier et al., 1999). At the beginning of the development of environmental education in local primary schools, Greek scholars surveyed 686 students in 5th and 6th Grade of primary schools on environmental knowledge and attitudes, and students' environmental knowledge and attitudes were mainly influenced by textbooks (Paraskevopoulos et al., 1998). Lebanese scholars have measured environmental knowledge and attitudes among 660 local middle school students in 10th and 11th Grade. The results show that the students' environmental attitudes are very positive, but their understanding of environmental knowledge and concepts is still insufficient; this may be because they have not been exposed to new environmental education for a very long time (Makki et al., 2003). Rickinson (2001) showed that students' knowledge level of the actual environment is generally low. Scholars in mainland China have conducted a comparative study on students' environmental knowledge and attitudes aged 16-20 in Gansu and Shanghai. The research results showed that the students in the two places have good environmental attitudes but lack environmental knowledge. Comparatively speaking, students in Shanghai have a higher level of environmental knowledge, a more positive attitude towards the environment, and are more similarly to act in an environmentally responsible way in the future. In contrast, regional differences were found in environmental knowledge, attitudes, and behaviours levels (He et al., 2011). A study from Al-Rabaani and Al-Shuili (2020) also showed that 4,512 students in 11th and 12th Grade (including n=2136 in 11th grade, and n=2379 in 12th grade) who received basic environmental education in 11 provinces in Oman country have a significant

positive performance in environmental knowledge, environmental attitude, and environmental behaviours.

Most scholars find that men are more knowledgeable about environmental issues than women; men are more knowledgeable about the environment than women (Levine & Strube, 2012; Mustafa, 2007). But other studies have found mixed results, with girls' environmental attitudes and environmental knowledge better than boys' (Coertjens et al., 2010; Duarte, 2017; Pauw & Petegem, 2010; Zelezny et al., 2000). Some studies have also shown that schools are able to influence students' environmental knowledge and attitudes, and that schools that teach science and environmental courses in more practical ways are connected with higher environmental awareness of students, while environmental learning activities are associated with more pro-environmental attitudes among students (Coertjens et al., 2010). The mastery of languages other than the native language also has a certain impact on students' environmental attitudes (Pauw & Petegem, 2011).

Some scholars have also conducted comparative studies on students' environmental literacy in ecological schools and conventional schools. The research results of Krnel and Naglic (2009) showed that the knowledge level of students in ecological schools to be slightly higher than that of students in conventional schools. On the other hand, there was no statistically significant difference between the two groups regarding students' environmental awareness and environmental behaviours. These findings indicated that environmental knowledge does not affect students' attitudes, awareness, and behaviours towards the environment. Portuguese scholars conducted a comparative study on environmental knowledge, attitudes, and behaviours regarding the environmental literacy of local 9th Grade students in Eco-Schools and ordinary schools. The study results found that the performance of students in Eco-schools was not significantly higher than that of ordinary schools in these three components (Spinola, 2015).

Scholars in Indonesia have done many studies on students' Adiwiyata programme in their country: the environmental literacy of students in green and non-green schools. A 2017 study in Indonesia showed that high school students in the Adiwiyata Green School Project did not show very positive environmental knowledge levels and attitudes (Meilinda, 2017). In contrast, some scholars measured and compared the environmental literacy of 275 Adiwiyata and non-Adiwiyata students in four local state high schools. The results showed that the Adiwiyata Green School Project could help students improve their environmental literacy (Nurwidodo et al., 2020). Furthermore, scholars in Israel and Belgium have also proposed that the development of Eco-schools and green schools has a very positive impact on students' environmental knowledge, attitudes, and other related environmental literacy (Goldman et al., 2018; Özsoy et al., 2012). Promoting the development of green school projects is very beneficial to students' receiving environmental education and deepening their learning of environmental literacy. Scholars from the Netherlands, Slovenia, and Iceland have found that although students in Eco-schools have significantly better environmental knowledge than students in ordinary schools, they have not found a more positive performance in environmental attitudes (Hallfredsdóttir, 2011; Krnel & Naglic, 2009; Pauw & Petegem, 2011).

However, the studies on students' environmental literacy in mainland China is still in the developing stage. Moreover, the research on students' environmental knowledge, attitudes, and behaviours regarding environmental literacy in green schools is limited. Therefore, based on the green school project in Zhengzhou City, the present study investigated: i) 5th and 6th Grade students' environmental knowledge, pro-environmental attitudes, and pro-environmental behaviours regarding environmental literacy in green and non-green schools to examine the implementation of the green school project; ii) 5th and 6th Grade students' environmental knowledge, pro-environmental attitudes, and pro-environmental behaviours regarding environmental literacy in different level green schools or non-green schools. In addition, the

present study discussed the linear correlation between these three components as previously mentioned.

4.2 Methodology

4.2.1 Methodology

The present study mainly used quantitative research method to conduct research. Quantitative research is a systematic investigation of phenomena by collecting quantifiable data and performing statistical, mathematical, or computational techniques. It mainly used the form of questionnaire survey to measure students' environmental knowledge, environmental attitudes and environmental behaviours in green schools and non-green schools. The results of quantitative analysis were used to compare the significant differences between students in green and non-green schools.

4.2.2 Instrument

The present study used questionnaires to investigate students' possessions of environmental knowledge, pro-environmental attitudes, and pro-environmental behaviours. i) There was a total of 20 questions in the environmental knowledge part. The answers could be "Yes," "NO," and "Don't Know," and a correct answer was worth 1 point, and an incorrect answer or 'Don't Know' was worth 0 points; ii) There were 15 questions in the environmental attitudes part to assess students' attitudes toward protecting the environment. The answers were presented in the form on a Likert scale ranging from 'Strongly Disagree (1)', 'Disagree (2)', 'Neutral (3)', 'Agree (4)' to 'Strongly Agree (5)'. To ensure the validity of students' answers, this research changed the questions from positive to negative; iii) There was a total of 15 questions in the environmental behaviours part to measure students' behaviours toward protecting the

environment, the answers could either be 'Yes or No,' with the answers worth 1 point with 'Yes,' or 0 points with 'No.'

The questionnaires for the environmental knowledge and environmental attitudes were derived from the New Environmental Paradigm Scale (Lundmark, 2007; Thapa, 2001) and Cheng and So (2015), while the environmental behaviours part questionnaires were adapted from the New Environmental Paradigm (NEP) and Krneal and Naglic (2009) research content. Some questions were intricate for the age of students in this research. To enable the students in the study site to fully understand the questionnaire's content, this research adjusted the questions reasonably. However, to further ensure the reliability of the questionnaire, this research selected 20 students from 5^{th} and 6^{th} Grade in the research site to do the Pilot Test. The final questionnaire reliability results were *Cronbach α 0.86 for the environmental knowledge part, Cronbach α 0.67 for the environmental attitude part*, and *Cronbach α 0.82 for the environmental behaviours part*, which showed that the questionnaire had enough credibility and can be used in future research. The questionnaire contents are presented in Appendix 2: Chapter 4 (Part 2) section.

4.3 Sample and Procedure

The questionnaire collected data through online links and a paper version. To distinguish and facilitate the final statistics, the students in green schools uniformly used the online link to complete the survey. Among them, the teachers of the classes cooperated and supervised the students to complete all the questionnaire contents. In contrast, the researcher arranged for students in non-green schools to take a paper version of the questionnaire survey which was completed in class and supervised by the teacher in each class.

The present study determined four green schools, including two provincial-level and two municipal-level green schools. Meanwhile, this research also identified four non-green schools at the same level. The sample was selected using a cluster sampling approach. This research initially planned to select two classes in the 5th and 6th Grade in four green schools and selected randomly $N = 15$ students from each class to complete the questionnaire, with $N = 240$ students. The total number of students who participated in the questionnaire survey was $N = 285$, of which, $N = 138$ was in the 5th Grade and $N = 147$ were in 6th Grade. Students were required to complete this questionnaire in science courses. Under the guidance of teachers and the high cooperation of students, the total number of $N = 120$ students in 5th Grade completed the questionnaire survey (The remaining 18 students left due to personal reasons or halfway, forgot to submit, or incomplete answers to the questionnaire, etc., were not counted in the final statistical results), and $N = 125$ students in the 6th Grade completed the questionnaire survey (The remaining 22 students left due to personal reasons or halfway, forgot to submit, or had incomplete answers to the questionnaire, etc.). Finally, the number of valid questionnaires for the four green schools was 245.

At the same time, it was planned to select two classes in 5th and 6th Grade in four non-green schools and randomly select $N = 15$ students from each class to complete the questionnaire, with 240 students. However, the total number of students who participated in the questionnaire survey was 288, including $N = 156$ students in the 5th Grade and $N = 132$ students in the 6th Grade. The students completed the questionnaire in the science course. Under the guidance of the teacher and the high cooperation of the students, the total number of students in the 5th Grade who completed the questionnaire was 120 (The remaining 36 students gave up halfway due to lack of time, incomplete answer sheets, etc., and were not counted in the final statistical results). The total number of students who completed the questionnaire survey in the 6th Grade was 120 (The remaining 12 students had incomplete answer sheets). Finally, the number of

valid questionnaires for the four non-green schools was 240. The following Table 4.1 presents the participants who eventually participated in the study:

Table 4.1
Sample Characteristics

School Type	School Number	Classes	Participants	Total Participants
Green Schools	4	5th	120	245
		6th	125	
Non-Green Schools	4	5th	120	240
		6th	120	

4.4 Statistical Analysis

This research mainly used SPSS Version 26 to analyse the statistical results of the final data. a) *t-test* to investigate students' possession of environmental knowledge, pro-environmental attitudes, and pro-environmental behaviours between green and non-green schools or in the provincial-level and municipal-level green schools; b) One-Way ANOVA to determine the impact of students' environmental knowledge, attitudes, and behaviours in different non-green schools; and c) Pearson correlation analysis to discuss the correlation between these three components.

4.5 Results

4.5.1 Students' Possession of Environmental Knowledge Comparison between Green and Non-Green Schools

Firstly, 5th and 6th Grade students' environmental knowledge comparisons were made. The environmental Knowledge component was divided into 5 sections: *'Ozone Layer,' 'Green House and Global Warming,' 'Air Pollution, 'Environmental Information,'* to compare students' possession of environmental knowledge in green and non-green schools.

Table 4.2 illustrates a significant difference ($p < 0.001$) between students' environmental knowledge in green and non-green schools. Moreover, the overall average score of the 20 questions in the environmental knowledge were mean = 15.35, mean = 12.97 for students in green and non-green schools, respectively. In detail, students in green schools were found to have better performance ($p < 0.001$) on 'Ozone Layer (mean = 14.45 for green schools, mean = 11.00 for non-green schools),' 'Green House and Global Warming (mean = 14.96, mean = 13.00),' 'Air Pollution (mean = 15.90 for green schools, mean = 14.28 for non-green schools) ', and 'Environmental Information (mean = 16.02 for green schools, mean = 13.60 for non-green schools).' presented in the environmental knowledge component.

Table 4.2

Students' Possession of Environmental Knowledge in Green and Non-Green Schools

Question	**School Type**	**N**	**Mean**	**SD**	**F**	***p*-value**
Ozone Layer						
Q1	Green School	245	12.60	0.483	6.297	0.012*
	Non-Green School	240	11.60	0.495		
Q2	Green School	245	17.20	0.346	182.439	< 0.001***
	Non-Green School	240	12.20	0.488		
Q3	Green School	245	12.80	0.480	1.697	0.193
	Non-Green School	240	12.40	0.487		
Q4	Green School	245	13.60	0.468	15.821	< 0.001***
	Non-Green School	240	8.20	0.493		
Q5	Green School	245	16.00	0.404	125.311	< 0.001***
	Non-Green School	240	10.60	0.500		
Sub-total	Green School	245	14.45	0.140	67.614	< 0.001***
	Non-Green School	240	11.00	0.276		
Green house and Global Warming						
Q6	Green School	245	14.20	0.455	6.325	0.012*
	Non-Green School	240	13.20	0.476		
Q7	Green School	245	15.00	0.436	49.668	< 0.001***
	Non-Green School	240	11.80	0.492		
Q8	Green School	245	14.80	0.438	15.536	< 0.001***
	Non-Green School	240	13.20	0.474		
Q9	Green School	245	14.60	0.447	17.880	< 0.001***
	Non-Green School	240	12.80	0.482		
Q10	Green School	245	16.20	0.395	33.027	< 0.001***
	Non-Green School	240	14.00	0.460		
Sub-total	Green School	245	14.96	0.156	39.012	< 0.001***
	Non-Green School	240	13.00	0.237		

Air Pollution						
Q11	Green School	245	14.00	0.458	0.000	1.000
	Non-Green School	240	14.00	0.458		
Q12	Green School	245	17.00	0.359	35.807	< 0.001***
	Non-Green School	240	14.80	0.438		
Q13	Green School	245	16.00	0.401	2.375	0.124
	Non-Green School	240	15.40	0.421		
Q14	Green School	245	16.00	0.398	37.280	< 0.001***
	Non-Green School	240	13.80	0.465		
Q15	Green School	245	16.60	0.378	67.395	< 0.001***
	Non-Green School	240	13.40	0.470		
Sub-total	Green School	245	15.90	0.204	16.178	< 0.001***
	Non-Green School	240	14.28	0.147		
Environmental Information						
Q16	Green School	245	15.00	0.433	20.653	< 0.001***
	Non-Green School	240	13.20	0.476		
Q17	Green School	245	16.40	0.388	0.476	0.490
	Non-Green School	240	16.00	0.398		
Q18	Green School	245	16.15	0.388	11.046	< 0.001***
	Non-Green School	240	15.20	0.399		
Q19	Green School	245	16.20	0.355	14.501	<0.001***
	Non-Green School	240	15.80	0.410		
Q20	Green School	245	16.60	0.395	93.448	< 0.001***
	Non-Green School	240	7.80	0.488		
Sub-total	Green School	245	16.02	0.159	30.675	< 0.001***
	Non-Green School	240	13.60	0.207		
Total	Green School	245	15.35	0.079	120.457	< 0.001***
	Non-Green School	240	12.97	0.160		

*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$

4.5.2 Students' Pro-environmental Attitudes Comparison between Green and Non-Green Schools

The environmental attitudes questionnaire contained 16 questions on a Likert scale which ranged from 1 (strongly disagree) to 5 (strongly agree), to assess students' negative to positive attitudes towards protecting the environment. Furthermore, the comparison survey was made to compare students' environmental attitudes between green and non-green schools. The results are presented in Table 4.3.

Table 4.3 presents a significant difference ($p < 0.001$) in students' pro-environmental attitudes between green and non-green schools. Moreover, the average scores of students in green schools and non-green schools in the 15 viewpoints in the environmental attitude section were mean = 4.51, mean = 4.33, respectively.

However, the results showed that students' average scores in non-green schools were higher but not significant ($p > 0.05$) than in green schools in the following viewpoints: *Q3. Q4.* (Questionnaire are presented in Appendix 2 for Chapter 4 (Part 2)).

Table 4.3

Students' Pro-environmental Attitudes in Green and Non-Green Schools

Question	School Type	N	Mean	SD	F	*p-value
Q1	Green School	245	4.59	0.525	18.303	< 0.001***
	Non-Green School	240	4.26	0.802		
Q2	Green School	245	4.56	0.559	18.936	< 0.001***
	Non-Green School	240	4.30	0.723		
Q3	Green School	245	4.55	0.561	1.082	0.299
	Non-Green School	240	4.56	0.609		
Q4	Green School	245	4.43	0.666	0.001	0.981
	Non-Green School	240	4.46	0.668		
Q5	Green School	245	4.51	0.605	2.940	0.087
	Non-Green School	240	4.44	0.690		
Q6	Green School	245	4.39	0.629	0.338	0.561
	Non-Green School	240	4.47	0.643		
Q7	Green School	245	4.48	0.584	1.814	0.179
	Non-Green School	240	4.44	0.635		
Q8	Green School	245	4.51	0.605	11.354	< 0.001***
	Non-Green School	240	4.36	0.731		
Q9	Green School	245	4.66	0.474	29.774	< 0.001***
	Non-Green School	240	3.91	0.898		
Q10	Green School	245	4.35	0.564	1.111	0.292
	Non-Green School	240	4.11	0.662		
Q11	Green School	245	4.52	0.584	6.946	0.009**
	Non-Green School	240	4.42	0.665		
Q12	Green School	245	4.46	0.546	10.034	0.002**
	Non-Green School	240	4.40	0.704		
Q13	Green School	245	4.54	0.531	18.496	< 0.001***
	Non-Green School	240	4.20	0.891		
Q14	Green School	245	4.51	0.517	10.647	< 0.001***
	Non-Green School	240	4.28	0.756		
Q15	Green School	245	4.50	0.540	12.667	< 0.001***
	Non-Green School	240	4.40	0.721		

Total	Green School	245	4.51	0.145	21.666	< 0.001***
	Non-Green School	240	4.33	0.253		

*p < 0.05; **p < 0.01; ***p < 0.001

4.5.3 Students' Pro-environmental Attitudes Comparison between Green and Non-Green Schools

The environmental behaviours questionnaire contained 15 viewpoints from 1 (Yes) to 0 (No) to assess students 'Can you do this thing for protecting our environment?' The comparison survey compared students between green and non-green schools.

Table 4.4 presents a significant difference (p < 0.001) in students' environmental behaviours between green and non-green schools. Moreover, the average scores of students in green and non-green schools in the 15 items in the environmental behaviours section were mean = 0.95, and mean = 0.85, respectively.

Furthermore, the average score for *Q*8 *(Do you leave any water after drinking?)* of students in non-green schools (mean = 0.89) was higher but not significant (p > 0.05) than in green schools (mean = 0.90). In Q9 *'Do you leave tap often during brushing'* the average score of students in non-green schools (mean = 0.95) is higher than in green schools. However, no difference in green schools and non-green schools can be observed (p > 0.05).

Table 4.4

Students' Pro-environmental Behaviours in Green Schools and Non-Green Schools

Question	School Type	N	Mean	SD	F	*p-value
Q1	Green School	245	1.00	0.000	25.780	< 0.001***
	Non-Green School	240	0.98	0.155		
Q2	Green School	245	0.80	0.398	79.418	< 0.001***
	Non-Green School	240	0.62	0.485		
Q3	Green School	245	0.97	0.167	9.949	0.002**
	Non-Green School	240	0.94	0.233		
Q4	Green School	245	0.96	0.198	44.234	< 0.001***
	Non-Green School	240	0.88	0.324		
Q5	Green School	245	0.98	0.155	106.267	< 0.001***
	Non-Green School	240	0.86	0.346		
Q6	Green School	245	0.97	0.167	62.043	< 0.001***

	Non-Green School	240	0.89	0.319		
Q7	Green School	245	0.96	0.188	46.689	< 0.001***
	Non-Green School	240	0.89	0.319		
Q8	Green School	245	0.89	0.319	0.760	0.384
	Non-Green School	240	0.90	0.303		
Q9	Green School	245	0.94	0.240	0.146	0.702
	Non-Green School	240	0.95	0.233		
Q10	Green School	245	0.89	0.314	150.721	< 0.001***
	Non-Green School	240	0.69	0.465		
Q11	Green School	245	0.91	0.286	15.800	< 0.001***
	Non-Green School	240	0.85	0.355		
Q12	Green School	245	1.00	0.000	203.059	< 0.001***
	Non-Green School	240	0.87	0.338		
Q13	Green School	245	1.00	0.000	825.917	< 0.001***
	Non-Green School	240	0.74	0.440		
Q14	Green School	245	0.99	0.110	177.912	< 0.001***
	Non-Green School	240	0.85	0.359		
Q15	Green School	245	0.93	0.248	0.504	0.478
	Non-Green School	240	0.92	0.261		
Total	Green School	245	0.95	0.056	82.667	< 0.001***
	Non-Green School	240	0.85	0.126		

*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$

4.5.4 Students' Possession of Environmental Knowledge, Pro-environmental Attitudes, and Pro-environmental Behaviours Comparison between Different-level Green Schools

To further compare the difference between different-level green schools on students' possession of environmental knowledge, pro-environmental attitudes, and pro-environmental behaviours, *t-test* analysis was used to compare these three components in students between provincial-level and municipal-level green schools.

Table 4.5 shows that the average score on students' possession of environmental knowledge was 15.39 and 15.26 for provincial-level and municipal-level green schools. Furthermore, there was no significant difference in students' environmental knowledge between different-level green schools ($p > 0.05$). In detail, no significant difference ($p > 0.05$) could be observed in *'Ozone Layer,' 'Green House and Global Warming,' 'Air Pollution, and 'Environmental Information.'*

Table 4.6 reveals a significant difference ($p < 0.05$) in students' performance of pro-environmental attitudes between provincial-level (mean = 4.55) and municipal-level (mean = 4.46) green schools.

Finally, Table 4.7 illustrates no significant difference ($p > 0.05$) between students' pro-environmental behaviours between provincial-level (mean = 0.95) and municipal-level (mean = 0.94) green schools.

Table 4.5
Students' Possession of Environmental Knowledge in Provincial-level and Municipal-level Green Schools

Question	Green School	N	Mean	SD	F	*p-value
Ozone Layer						
Q1	Provincial level	120	12.20	0.490	2.311	0.441
	Municipal level	125	13.20	0.477		
Q2	Provincial level	120	18.20	0.290	18.798	0.037*
	Municipal level	125	16.40	0.389		
Q3	Provincial level	120	11.80	0.494	10.639	0.089
	Municipal level	125	14.00	0.462		
Q4	Provincial level	120	14.80	0.440	17.267	0.036*
	Municipal level	125	12.40	0.488		
Q5	Provincial level	120	16.40	0.389	2.500	0.432
	Municipal level	125	15.60	0.419		
Sub-total	Provincial level	120	14.66	0.138	0.386	0.235
	Municipal level	125	14.24	0.142		
Green-house and Global Warming						
Q6	Provincial level	120	14.40	0.453	0.190	0.828
	Municipal level	125	14.00	0.458		
Q7	Provincial level	120	16.40	0.389	25.549	0.014*
	Municipal level	125	13.60	0.468		
Q8	Provincial level	120	14.40	0.453	3.357	0.360
	Municipal level	125	15.40	0.424		
Q9	Provincial level	120	15.20	0.430	4.804	0.276
	Municipal level	125	14.00	0.462		
Q10	Provincial level	120	16.20	0.395	0.000	0.995
	Municipal level	125	16.20	0.395		
Sub-total	Provincial level	120	15.26	0.156	0.764	0.276
	Municipal level	125	14.62	0.155		
Air Pollution						

Q11	Provincial level	120	13.60	0.458	1.555	0.532
	Municipal level	125	14.40	0.458		
Q12	Provincial level	120	17.00	0.414	8.179	0.157
	Municipal level	125	16.85	0.458		
Q13	Provincial level	120	16.20	0.425	0.120	0.863
	Municipal level	125	15.80	0.419		
Q14	Provincial level	120	15.70	0.453	4.155	0.308
	Municipal level	125	16..40	0.477		
Q15	Provincial level	120	15.80	0.408	9.219	0.134
	Municipal level	125	17.20	0.344		
Sub-total	Provincial level	120	15.66	0.204	0.080	0.818
	Municipal level	125	16.13	0.147		
Environmental Information						
Q16	Provincial level	120	15.60	0.414	5.296	0.254
	Municipal level	125	14.40	0.451		
Q17	Provincial level	120	15.40	0.425	8.489	0.149
	Municipal level	125	16.80	0.368		
Q18	Provincial level	120	15.60	0.382	26.450	0.013*
	Municipal level	125	17.20	0.465		
Q19	Provincial level	120	15.90	0.444	17.282	0.041*
	Municipal level	125	16.90	0.368		
Q20	Provincial level	120	17.40	0.341	22.385	0.023*
	Municipal level	125	15.00	0.434		
Sub-total	Provincial level	120	15.98	0.1629	0.424	0.185
	Municipal level	125	16.06	0.1553		
Total	Provincial level	120	15.39	0.848	0.560	0.120
	Municipal level	125	15.26	0.784		

*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$

Table 4.6

Students' Pro-environmental Attitudes in Provincial-level and Municipal-level Green Schools

Question	Green School	N	Mean	SD	F	*p-value
Q1	Provincial level	120	4.62	0.488	4.675	0.469
	Municipal level	125	4.57	0.558		
Q2	Provincial level	120	4.54	0.607	5.151	0.555
	Municipal level	125	4.58	0.511		
Q3	Provincial level	120	4.59	0.527	4.197	0.222
	Municipal level	125	4.50	0.591		
Q4	Provincial level	120	4.49	0.661	0.026	0.175
	Municipal level	125	4.38	0.668		
Q5	Provincial level	120	4.53	0.565	2.977	0.633
	Municipal level	125	4.49	0.643		
Q6	Provincial level	120	4.48	0.594	0.239	0.025*
	Municipal level	125	4.30	0.650		
Q7	Provincial level	120	4.53	0.533	5.247	0.175
	Municipal level	125	4.43	0.627		
Q8	Provincial level	120	4.59	0.542	3.145	0.049*
	Municipal level	125	4.44	0.653		

Q9	Provincial level	120	4.65	0.479	0.522	0.717
	Municipal level	125	4.67	0.471		
Q10	Provincial level	120	4.36	0.531	1.741	0.757
	Municipal level	125	4.34	0.595		
Q11	Provincial level	120	4.60	0.571	1.384	0.041*
	Municipal level	125	4.45	0.588		
Q12	Provincial level	120	4.50	0.535	0.106	0.230
	Municipal level	125	4.42	0.556		
Q13	Provincial level	120	4.63	0.517	2.807	0.006**
	Municipal level	125	4.45	0.531		
Q14	Provincial level	120	4.58	0.496	3.382	0.072
	Municipal level	125	4.46	0.531		
Q15	Provincial level	120	4.53	0.534	0.273	0.516
	Municipal level	125	4.48	0.548		
Total	Provincial level	120	4.55	0.138	0.002	<0.001***
	Municipal level	125	4.46	0.141		

*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$

Table 4.7

Students' Pro-environmental Behaviours in Provincial-level and Municipal-level Green Schools

Question	Green School	N	Mean	SD	F	*p-value
Q1	Provincial level	120	1.00	0.000	0.000	1.000
	Municipal level	125	1.00	0.000		
Q2	Provincial level	120	0.86	0.350	18.683	0.036*
	Municipal level	125	0.75	0.434		
Q3	Provincial level	120	0.95	0.219	16.701	0.045*
	Municipal level	125	0.99	0.089		
Q4	Provincial level	120	0.93	0.250	17.250	0.049*
	Municipal level	125	0.98	0.126		
Q5	Provincial level	120	0.98	0.129	2.421	0.440
	Municipal level	125	0.97	0.177		
Q6	Provincial level	120	0.94	0.235	34.912	0.106
	Municipal level	125	1.00	0.000		
Q7	Provincial level	120	0.98	0.129	11.233	0.103
	Municipal level	125	0.94	0.231		
Q8	Provincial level	120	0.83	0.382	39.771	0.003**
	Municipal level	125	0.94	0.231		
Q9	Provincial level	120	0.98	0.157	34.902	0.020
	Municipal level	125	0.90	0.296		
Q10	Provincial level	120	0.83	0.374	2.532	0.020*
	Municipal level	125	0.94	0.231		
Q11	Provincial level	120	0.93	0.264	13.394	0.006**
	Municipal level	125	0.90	0.306		
Q12	Provincial level	120	1.00	0.000	0.000	1.000
	Municipal level	125	1.00	0.000		
Q13	Provincial level	120	1.00	0.000	0.000	1.000
	Municipal level	125	1.00	0.000		

Q14	Provincial level	120	0.98	0.157	13.394	0.076
	Municipal level	125	1.00	0.000		
Q15	Provincial level	120	0.92	0.278	5.081	0.265
	Municipal level	125	0.95	0.215		
Total	Provincial level	120	0.94	0.000	0.384	0.092
	Municipal level	125	0.95	0.000		

*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$

4.5.5 Students' Possession of Environmental Knowledge, Pro-environmental Attitudes and Pro-environmental Behaviours Comparison between Different Non-Green Schools

Table 4.8 shows that $N = 240$ students, namely, $N = 60$ in School A, $N = 60$ in School B, $N = 60$ in School C, *and* $N = 60$ in School D, had a significant difference between the group in environmental knowledge ($p < 0.01$), environmental attitudes ($p < 0.05$), and environmental behaviours ($p < 0.001$) in four non-green schools.

Table 4.8

Students' Possession of Environmental Knowledge, Pro-environmental Attitudes, and Pro-environmental Behaviours in Different Non-Green Schools

Environmental Knowledge					
School Types	N	Mean	Std. Deviation	F	Sig.
School A	60	12.38 c	0.157		
School B	60	13.06 bc	0.176		
School C	60	13.66 ab	0.159	4.659	0.003***
School D	60	14.40 a	0.135		
Total	240	13.36 ab	0.160		
*$p < 0.05$, ** $p < 0.01$, ***$p < 0.001$					
Pro-environmental Attitudes					
School Types	N	Mean	Std. Deviation	F	Sig.
School A	60	4.32 b	0.270		
School B	60	4.36 ab	0.346		
School C	60	4.37 a	0.206	3.175	0.025*
School D	60	4.39 a	0.135		
Total	240	4.33 b	0.253		
*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$					
Pro-environmental Behaviours					
School Types	N	Mean	Std. Deviation	F	Sig.

School A	60	0.82 b	0.140		
School B	60	0.82 b	0.123		
School C	60	0.86 b	0.142	7.888	< 0.001***
School D	60	0.91 a	0.069		
Total	240	0.86 b	0.126		

*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$

For four different non-green schools, the same marked letter represents students in four non-green schools with no significant difference in the performance of environmental knowledge, pro-environmental attitudes, and pro-environmental behaviours. However, different marked letters indicate the significant difference between School A, School B, School C, and School D on these above-mentioned components at $p < 0.05$.

4.6 Discussion

4.6.1 The Comparison of Students' Possession of Environmental Knowledge, Pro-environmental Attitudes and Pro-environmental Behaviours

The results show that students in 5th and 6th Grade in green schools have higher performance in environmental knowledge, attitudes toward protecting the environment and behaviours towards protecting the environment than students in non-green schools. These results are consistent with previous research that students' environmental knowledge, attitudes, behaviours, and related environmental literacy in green schools and eco-schools are higher than in ordinary schools, and green schools help students improve their environmental literacy (Goldman et al., 2018; Nurwidodo et al., 2020; Özsoy et al., 2012). One Belgian study also proposed that schools with eco-school certificates would change students' environmental outcomes (Pauw & Petegem, 2018). These studies results indicate the significantly effective implementation of the green school project. However, the present study contradicts some previous studies that students' environmental knowledge, environmental attitudes, and environmental behaviours in eco-schools are not significantly higher than in ordinary schools (Krnel & Naglic, 2009; Spinola, 2015). In addition, students' performance in environmental attitudes is not very positive in eco-schools (Meilinda, 2017).

Green schools provide students with environmental education training and activities, requiring teachers to actively integrate environmental knowledge into various disciplines in Zhengzhou City (Zhengzhou Education Bureau, 2021). Therefore, students can receive environmental education and develop their interest in environmental education in order to enhance their environmental knowledge, attitudes, and behaviours through environmental education in green schools. As Hsu (2004) proposed, students who have good environmental education and training can effectively improve their environmental protection behaviours, environmental responsibility, and relevant environmental knowledge related to environmental issues, and Rachman and Maryani (2018) also mentioned the environmentally friendly behaviours of students is provided by more environmental activities. Green schools measure students' environmental literacy regularly by a questionnaire survey to test the implementation of environmental education in schools (Zhengzhou Education Bureau, 2021) and according to Nugraha et al. (2019), environmental education aims to equip students with adequate environmental literacy so that students have extent understanding of environmental literacy in green schools, especially primary school students. For primary school students, their ability to accept new things and plasticity are relatively strong, just as Qiu (2003) mentioned, primary and secondary school students are in a primary developmental stage of physical and mental health. They gradually form their views on life and the world in the process of learning. At the same time, they are also easily affected by the surrounding environment. The evolution of the green school project can cultivate students' outlook on life and values at a critical stage of primary and secondary school scholars and benefit students' mental health. After receiving environmental education, students' scores on environmental knowledge have improved significantly, and environmental attitudes will also become more positive (Bradley, 1999). Furthermore, students who attend schools that organise environmental learning activities show more positive environmental attitudes (Coertjens et al., 2010). As students continue to study in

green schools, their environmental literacy, especially environmental knowledge, will gradually improve, which will have a cumulative positive impact on them (Nurwidodo et al., 2020). Therefore, students in green schools will be more positive in their performance in environmental knowledge, pro-environmental attitude, and pro-environmental behaviours regarding environmental literacy. Furthermore, the present findings were also consistent with environmental education effectively improve environmental knowledge and attitudes (Alam, 2017; Norris & Juliet, 2016). Environmental education has the positive impact on students' environmental behaviours (Al-Rabaani & Al-Shuili, 2020).

The findings also show that students in non-green schools have lower environmental knowledge, pro-environmental attitudes, and pro-environmental behaviours than green schools. This is because the non-green schools in Zhengzhou City only arrange for students to learn environment-related courses in science subjects and voluntarily provide students with relevant environmental education, training, and other environmental activities. Therefore, students in non-green schools have fewer opportunities to obtain environmental education than students in green schools. As a result, their performance in environmental knowledge, pro-environmental attitudes, and pro-environmental behaviours will be relatively poor. Many students are not even interested in environmental knowledge. The present finding consistent with Nurwidodo et al. (2020), mentioning that the lower environmental literacy of students in non-Adiwiyata schools is due to the lack of general environmental school education programmes.

In addition, the green school project is conducive for students in Zhengzhou City. Therefore, the green school project can be suggested to carry out optimally in more primary schools. Because current primary students will have a significant impact on future environmental conditions (Lozano, 2006; Waas et al., 2010; Wright, 2007; Zilahy & Huisingh, 2009) and green schools are conducive for cultivating students' correct outlook on life and values and are conducive to the development of students' physical and mental health (Qiu, 2003, p. 125). To

better improve students' environmental knowledge, environmental attitudes, and environmental behaviours of environmental literacy, both green schools and non-green schools should actively integrate environmental education into students' classrooms, and the educational games based on environmental literacy, such as EnviroPoly, these ways can be great help in enhancing students' environmental literacy (Arslan et al., 2011).

4.6.1.1 The Comparison on Students' Possession of Environmental Knowledge, Pro-environmental Attitudes and Pro-environmental Behaviours in Different Green and Non-Green Schools

Many scholars have undertaken relevant research on environmental knowledge, attitudes, and behaviours that may affect students and other environmental literacy factors that can affect them (Arnocky & Stroink, 2010; Coertjens et al., 2010; Duarte, 2017; He et al., 2011; Pauw & Petegem, 2010; Zelezny, 2000). Among them, region, gender, school, etc., are all factors that may affect students' environmental literacy. The main reasons for the regional differences in the three components of environmental knowledge, environmental attitudes, and environmental behaviours are the economic and environmental differences between the east and west of China (He et al., 2011). Men are more knowledgeable about environmental issues than women; men are more environmentally knowledgeable than women (Mustafa, 2007; Levine & Strube, 2012). However, other studies have found different findings, and girls have better environmental attitudes and environmental knowledge than boys (Tuncer et al., 2005). Gender is related to students' environmental attitudes, and girls are more supportive of the environment than boys (Arnocky & Stroink, 2010; Coertjens et al., 2010; Duarte, 2017; He et al., 2011; Pauw & Petegem, 2010; Zelezny, 2000). Research shows that schools can influence students' environmental knowledge and attitudes with more practical ways of teaching science connected with higher students' environmental awareness and environmental learning activities related to more pro-environmental attitudes among students (Coertjens et al., 2010).

And speaking different languages has a specific impact on students' environmental attitudes (Pauw & Petegem, 2011).

However, differing from previous studies, this present study mainly focused on whether there is a difference in students' environmental knowledge, attitudes, and behaviours between different-level green schools and non-green schools. Furthermore, this research did not discover that previous studies investigated whether two different levels of green schools (provincial-level vs. municipal-level) or non-green schools can influence students' environmental knowledge, environmental attitudes, and environmental behaviours.

The results showed no significant difference ($p > 0.05$) between students' performance in environmental knowledge and environmental behaviours in provincial-level and municipal-level green schools. In contrast, a significant difference ($p < 0.05$) in students' environmental attitudes between provincial-level and municipal-level green schools was observed. However, although the results showed no difference between environmental knowledge and behaviours components, the average score of students in provincial-level green schools was found to be higher than students in municipal-level green schools in these three abovementioned components. The present study argues that this phenomenon is based on the policy and selection criteria of the green school project in Zhengzhou City. The policy and selection criteria for provincial-level and municipal-level green schools are similar. All schools must be selected as municipal-green schools to compete as one provincial-level green school. Therefore, the municipal-green schools' standards and selection criteria are the foundation (Zhengzhou Education Bureau, 2021). With the standard and selection criteria for the green school project, all green schools provide students with environmental education training and activities and regularly assess their environmental literacy, including environmental knowledge, pro-environmental attitudes, and pro-environmental behaviours, to examine the implementation of environmental education in schools. As a result, students in provincial-level

and municipal-level green schools can receive the same-level environmental education training. As previously mentioned, their performance on these three components regarding environmental literacy was found to be all outstanding. However, differing from municipal-level green schools, provincial-level schools focus more on managing and implementing environmental education than each municipal-level green schools (Henan Education Bureau, 2020). Therefore, it will improve students' performance on these three components in provincial-level green schools than in municipal-level green schools. Even though not significant, the average score for students in provincial-level green schools was found to be a little higher.

The four different non-green schools from the One-Way ANOVA analysis observed significant differences in students' performance in different non-green schools in environmental knowledge ($p < 0.01$), environmental attitudes ($p < 0.05$), and environmental behaviours ($p < 0.001$). The present study argues that it may be due to each school's different teaching quality and level. High teaching quality in schools may lead to better environmental performance among students. Furthermore, School D intends to be selected as a municipal-level green school, so has referred to the selection criteria of green school projects in Zhengzhou City in order to improve its current school situation. At the same time, the school has provided opportunities for students to obtain environmental education training, activities, and related courses to enhance their environmental literacy, including environmental knowledge, attitudes, and behaviours. As some scholars have previously mentioned, environmental education can lead to better performance of students in environmental literacy (Craig & Allen, 2015; Laveaux et al., 2018). Therefore, students in School D performed better than in the other three schools

4.6.2 The Linear Correlation between Students' Environmental Knowledge, Pro-environmental Attitudes, and Pro-environmental Behaviours

The Pearson linear correlation between students' environmental knowledge, pro-environmental attitudes, and pro-environmental behaviours was explored between green and non-green schools. Furthermore, the present study did not discover any relevant research on students' correlation between these three previously mentioned components in mainland China.

Table 4.9 shows the correlation between environmental knowledge, pro-environmental attitudes, and pro-environmental behaviours among students in green and non-green schools. It is interesting to note that the correlation between environmental knowledge and pro-environmental attitudes was found to be weak but significant ($r = 0.163$, $p < 0.001$), and the correlation between pro-environmental attitudes and pro-environmental behaviours was also weak but significant ($r = 0.184$, $p < 0.001$). Furthermore, the results showed that the correlation between environmental knowledge and pro-environmental behaviours to be weak and insignificant ($r = 0.072$, $p > 0.05$).

Table 4.9

The Linear Correlation between Students' Environmental Knowledge, Pro-environmental Attitudes, and Pro-environmental Behaviours in Green Schools and Non-Green Schools

Item		Environmental Knowledge	Pro-environmental Attitudes	Pro-environmental Behaviours
Environmental Knowledge	Pearson Correlation	1	0.163**	0.072**
	Sig. (2-tailed)		< 0.001	< 0.001
Pro-environmental Attitudes	Pearson Correlation		1	0.184**
	Sig. (2-tailed)			< 0.001
Pro-environmental Behaviours	Pearson Correlation			1
	Sig. (2-tailed)			

**. Correlation is significant at the 0.01 level (2-tailed).

The present study explored the Pearson linear correlation between students' environmental knowledge, pro-environmental attitudes, and pro-environmental behaviours in different types

of schools. The following tables show the result of students in green schools and non-green schools, respectively.

Table 4.10 shows the Pearson linear correlation between environmental knowledge, pro-environmental attitudes, and pro-environmental behaviours among $N = 245$ students in green schools. The finding illustrates that the correlation between environmental knowledge and pro-environmental attitudes was weak but significant ($r = 0.147$, $p < 0.05$). In contrast, the correlation between environmental knowledge and pro-environmental behaviours ($r = 0.002$, $p > 0.05$), or pro-environmental attitudes and pro-environmental behaviours ($r = 0.009$, $p > 0.05$) were insignificant.

Table 4.10

The Linear Correlation between Students' Environmental Knowledge, Pro-environmental Attitudes, and Pro-environmental Behaviours in Green Schools

Item		Environmental Knowledge	Pro-environmental Attitudes	Pro-environmental Behaviours
Environmental Knowledge	Pearson Correlation	1	0.147*	0.002
	Sig. (2-tailed)		0.021	0.970
Pro-environmental Attitudes	Pearson Correlation		1	0.009
	Sig. (2-tailed)			0.884
Pro-environmental Behaviours	Pearson Correlation			1
	Sig. (2-tailed)			

**. Correlation is significant at the 0.01 level (2-tailed).

Table 4.11 shows the linear correlation between environmental knowledge, pro-environmental attitudes, and pro-environmental behaviours among $N = 240$ students in non-green schools. However, the finding illustrates that the correlation between environmental knowledge and pro-environmental attitudes was weak and insignificant ($r = 0.024$, $p > 0.05$). In contrast, the correlation between environmental knowledge and pro-environmental behaviours ($r = -0.084$, $p > 0.05$) or pro-environmental attitudes and pro-environmental behaviours ($r = 0.009$, $p > 0.05$) were extremely weak and insignificant.

Table 4.11

The Linear Correlation between Students' Environmental Knowledge, Pro-environmental Attitudes, and Pro-environmental Behaviours in Non-Green Schools

Item		Environmental Knowledge	Pro-environmental Attitudes	Pro-environmental Behaviours
Environmental Knowledge	Pearson Correlation	1	0.024	-0.084
	Sig. (2-tailed)		0.705	0.189
Pro-environmental Attitudes	Pearson Correlation		1	0.029
	Sig. (2-tailed)			0.647
Pro-environmental Behaviours	Pearson Correlation			1
	Sig. (2-tailed)			

**. Correlation is significant at the 0.01 level (2-tailed)

The findings revealed the linear correlation between students' environmental knowledge and pro-environmental attitudes (r = 0.163, p < 0.001) or pro-environmental attitudes and pro-environmental behaviours (r = 0.184, p < 0.001) was significant among N = 485 students in green and non-green schools. However, the linear correlation between students' environmental knowledge and pro-environmental behaviours was insignificant (r = 0.072, p > 0.05). Although the latter correlation between these three components was small, this result is consistent with the inherent and traditional Environmental Education (EE) model, *EE knowledge-attitude-behaviours*. The linear correlation between environmental knowledge, environmental attitudes, and environmental behaviours is widely accepted by many scholars (Hungerford & Volk, 1990; Jensen & Schnack, 1997; Kollmuss & Agyeman, 2002). This model shows that environmental knowledge can affect environmental attitudes and can determine environmental behaviours. This result is consistent with these previous studies' result, the correlation between environmental knowledge, environmental attitudes, or environmental behaviours were low, but a clear and small relationship was observed between these variables (Makki et al., 2003); environmental knowledge does not necessarily affect students' environmental behaviours practices (Ahmad et al., 2015); good environmental knowledge contributes to positive environmental attitudes (Esa, 2010); students with higher environmental attitudes were willing to change their environmental behaviours, and there was a relationship between their environmental attitudes and behaviours (Johnson & Činčera, 2015). However, this result

contrasts with Kaiser and Fuhrer (2003), in that knowledge was a significant predictor of behaviours.

Interestingly, the linear correlation between students' environmental knowledge andro-environmental attitudes was low but significant in green schools ($r = 0.147$, $p < 0.05$). However, the correlation between environmental knowledge and pro-environmental behaviours ($r = 0.002$, $p > 0.05$), or pro-environmental attitudes and pro-environmental behaviours were weak and insignificant ($r = 0.009$, $p > 0.05$). In contrast, it can be obtained that the correlation between environmental knowledge and pro-environmental attitudes ($r = 0.024$, $p > 0.05$), environmental knowledge and pro-environmental behaviours ($r = -0.084$, $p > 0.05$), or pro-environmental attitudes and pro-environmental behaviours ($r = 0.029$, $p > 0.05$) were low and insignificant in non-green schools. The result in green schools demonstrates that even though the correlation between knowledge and attitudes was low, good environmental knowledge can encourage positive attitudes, as Esa (2010) proposed that good environmental knowledge can contribute to positive attitudes towards the environment. It also shows that the correlation was observed in students' environmental education in green schools as previous researchers have proposed that moderate, strong, and positive correlations between environmental knowledge and attitudes of students can be observed by participating in environmental training and activities (Arcury, 1990; Armstrong & Impara, 1991). Environmental education may affect a person's environmental knowledge or attitudes (Ogunbode & Arnold, 2012). Furthermore, a low and small correlation between environmental knowledge, attitudes, and behaviours cannot fully prove that environmental knowledge can directly affect attitudes and behaviours. As with previous research, the rather low correlations between participants' environmental knowledge and attitudes suggest that environmental knowledge of attitude and behaviour is not direct (Gambro & Switzky, 1994; Kuhlemeier et al., 1999, Makki et al., 2003). The results of green and non-green schools also indicated that

this was not the case with the traditional EE model, but consistent with the goal of education for sustainable development. Traditional EE focuses on acquiring environmental knowledge and hopes to change environmental attitudes through environmental knowledge, and environmental attitudes determine environmental behaviours. Regarding environmental education for citizens in European Eco-Schools, EE aims to develop environmentally responsible citizens who are environmentally responsible, can solve environmental problems, and understand sustainable development (Dobson, 2007; Huckle, 2001). In contrast, the goals of ESD further strengthen the development of citizens' behavioural capabilities and motivations. ESD emphasises the development of human behavioural capabilities and skills, not just limited to knowledge acquisition and cultivation (UNESCO, 2015). ESD development focuses on developing the values and skills of people to participate in decisions about the way we do things globally and locally, individually, and collectively, that will improve the quality of life now without harming the planet in the future (Summer et al., 2005).

There are still few studies on students' environmental knowledge, attitudes, and behaviours in environmental literacy, conducted in mainland China, and the research on students' environmental literacy of these three components in green schools is still in the developing stage. This research references future research on green schools and students' environmental literacy in mainland China. However, it still has certain limitations. First, because of COVID-19, only 5th and 6th Grade students could participate in the survey. Students in different grades may have different understandings of environmental issues. The present study suggests that future research can consider the differences brought by different grades. Secondly, the research site of this study was mainly in Zhengzhou City of Henan Province in mainland China, but due to regional differences, there may be gaps in the learning level of students. As proposed by previous research, the education levels of students in different cities are significantly different

(He et al., 2011). Furthermore, the selection criteria of green schools in different regions may also lead to differences in students' performance in environmental knowledge, attitudes, and behaviours. Therefore, this study also suggests that future scholars conduct more in-depth research based on green schools in different cities in mainland China.

4.7 Conclusion

The present study surveyed 5th and 6th Grade students' environmental attitudes, pro-environmental attitudes, and pro-environmental behaviours regarding environmental literacy in green and non-green schools. The comparison result demonstrates that students had better and more significant performance ($p < 0.001$) in these three components as previously mentioned than students in non-green schools. However, there was no significant difference found in students' environmental knowledge, pro-environmental attitudes, and pro-environmental behaviours between provincial-level and municipal-level green schools ($p > 0.05$). Furthermore, students' performance on these three components was different; students in School D that is preparing to be selected as 'municipal-level green school' had the best performance. This research also discovered a significant linear correlation between $N = 485$ students' environmental knowledge and pro-environmental attitudes ($r = 0.163$, $p < 0.01$), pro-environmental attitudes, and pro-environmental behaviours ($r = 0.184$, $p < 0.01$) in green and non-green schools. In contrast, no significant correlation between students' environmental knowledge and pro-environmental behaviours ($r = 0.072$, $p > 0.05$) could be observed.

To conclude, the green school project is conducive for students in Zhengzhou City of Henan Province. Therefore, it can be carried out optimally. The present study suggests that more primary schools in Zhengzhou City can actively participate in the application and selection of green schools. In addition, all schools should be suggested to provide students with regular assessments of environmental literacy, especially green schools. Finally, the inherent and

traditional *EE model* can be infallible. Therefore, green schools can integrate EE and ESD into the green school project in Zhengzhou City.

Chapter 5

A survey of Environmental Knowledge, Attitudes and Behaviours on Environment of Teachers in Green and Non-Green Schools (Part 3)

5.1 Introduction

5.1.1 Green School Movements

Green school movements have developed for a long time in the world. The emergence of green schools can be traced back to 1992. At the United Nations (UN) Conference on Environment and Development, the concept of green schools was put forward. In the months after, green schools were piloted in various countries. The names of green schools in various countries are also different, including Eco-Schools, Enviro-schools, Green Schools, Sustainable Schools, Resource Smart Schools, etc. (Gough, 2005). The goal of the green school is to take the local community, students, and teachers as the themes. Aiming at students can cultivate the ability to solve environmental problems through their studies in school and enhance their overall environmental attitudes and environmental behaviours. Meanwhile, green schools are also crucial for cultivating students with a sustainable development mentality (Gough, 2005). Despite this, the origin of the concept of green schools is still elusive, but our currently recognised thinking about them is derived from the Global Report of the Environmental Development Council (Brundtland, 1987). However, there is a difference in Green Schools' names worldwide, but the purpose and significance of establishing them are the same. Green schools also take the school as the main body vigorously promoting and developing green education and environmental education and uses of the school to reflect the goals and objectives of how environmental education is implemented in a region (Bolstad et al., 2004). The purpose of green school movements is also to provide a framework for the school to become a model of sustainable development in a region. Moreover, this framework-work

includes repositioning the school as sustainable development, formulating environmental policies and principles, action plans, in-service teacher education, and stakeholder participation in sustainable development for making decision. The goal of the green school is to enable students to take positive actions, develop their capacity for action, and increase their enthusiasm for participating in sustainable development plans. Therefore, the emergence and development of green schools are continuously promoting the environmental education of the entire society and the sustainable development of the environment. The most outstanding value of green and ecological schools is that they can be successfully turned into tools for sustainable development education and reasonable measures to promote sustainable development (Gough, 2005).

In mainland China, green schools are based on the aims of sustainability and environmental education to implement primary education, school management, resource usage, and environmental literacy for students and teachers (Zeng & Lee, 2009). They are mainly divided into: i) national level green schools; ii) provincial-level green schools; iii) autonomous regions green schools; and iv) municipal-level green schools. Each province has different standards for local and provincial-level green schools and municipal-level green schools. This research mainly focused on the green schools in Zhengzhou City, the capital city of Henan Province in mainland China. In Zhengzhou City, by the end of 2021 (statistics include universities, secondary schools, primary schools, and kindergartens), more than 300 schools have been awarded the title of "Municipal-level Green School," about 60 schools have been "Provincial-level Green School," and four schools have been "National Green School." Zhengzhou Green Primary Schools account for 10% of the total. The development goal of Zhengzhou Green Primary Schools is to have the foundation of green school projects in mainland China and fully incorporate the purpose of sustainable development into the management in daily work based on the schools' realisation of its essential educational function. By carrying out practical

environmental education activities, creating a cultural scope of environmental protection, comprehensively improving the environmental literacy of teachers and students, and allowing teachers and students to enhance basic knowledge, skills, attitudes, emotions, values, and behaviours for sustainable development in the process of actual participation. When a school reaches the municipal-level green school standard, it is eligible to compete with other schools in the province as a local green school. The requirements of the green school project in Zhengzhou City for primary school teachers are that schools should regularly provide special environmental education training and environmental activities for teachers of Chinese, mathematics, English, science, and other subjects, and teachers are required to actively publish their views on the current environment and relevant articles. It is expected that teachers can integrate environmental knowledge in the classroom on the premise of achieving primary education and actively spread and publicise the importance of environmental protection and sustainable development to students. Schools also measure teachers' environmental literacy every year to test the level environmental education teachers have acquired. (Zhengzhou Education Bureau, 2021). In the present study, the environmental knowledge, environmental attitudes, and environmental behaviours of teachers in green primary schools were investigated with the aim of examining whether the green school project is conducive to teachers in Zhengzhou City.

5.1.2 The Significance of Teachers in Environmental Education

Even in primary education, school education plays a vital role in developing environmental attitudes for students and teachers (Strong, 1998). As some research proposed before, teachers play a crucial role in students' learning (Robottom et al., 2000); teachers are an essential instrumental factor in forming these attitudes (Said et al., 2003); and students' achievement is related to teacher quality at all stages and subject areas of education (Crosby, 2000). Primary

education is fundamental for compulsory education, and many scholars believe it is the best stage for cultivating environmental literacy, implementing Environmental Education (EE) in primary schools, and assures teachers that it is crucial that they need to improve their Environmental Literacy (EL) (Cutter & Smith, 2001, 2003).

Some scholars also put forward that teachers' central role is to provide classroom teaching and help students learn. However, being a teacher involves more than just executing lesson plans. Teaching is a highly complex career. In addition to ensuring that students succeed academically, teachers must also act as surrogate parents, mentors, advisors, and even almost politicians. There are virtually no limits to teachers' roles (Cox, 2020). Teachers are tasked with setting a positive example for their students every day. What students learn from teachers is not only the content in the classroom but more about the skills of being in the world and contacting society.

In many cases, students first learn these things from their teachers. The teacher's role is constantly changing. While there used to be explicit course materials detailing how to be a qualified teacher, this was not a fair or efficient approach because it did not acknowledge students' personalities or real-life applications. Therefore, the role of teachers will change at different times (Ryan & Bourke, 2013). Aspiring teachers are expected to reveal pro-environmental behaviours and attitudes if they are to effectively integrate education for sustainable development (ESD) into their teaching after graduation (Esa, 2010). Teachers play an essential role in educating students, especially regarding environmental and other related issues and solutions. For this, teachers themselves should have the necessary awareness of environmental education (Nagara, 2010). Some scholars emphasise that teachers play an essential role in determining the quality of primary environmental education. Thus, the quality of primary environmental education depends on teachers' awareness of environmental issues, conservation, and education (Than, 2001). If teachers have a positive environmental attitude,

their students will have a positive attitude, and they will automatically be aware of environmental issues (Özden, 2008). Factors such as positive environmental attitudes, environmental sensitivity, and environmental knowledge and skills are significant in influencing teachers' decision-making in implementing environmental education (Ernst, 2009). When teachers themselves have a good understanding of the environment, students' environmental literacy will be improved (Turner et al., 2009).

Therefore, in terms of the importance of teachers and the importance of green schools as environmentally sustainable development, this research compared the environmental knowledge, environmental attitudes, and environmental behaviours of teachers in 5th and 6th Grade between green and non-green primary schools.

5.1.3 Knowledge, Attitudes and Behaviours on Environment

In the definition of environmental literacy by NAAEE (2004), environmental knowledge, environmental attitudes, and environmental behaviours are the three essential components of environmental literacy. Early scholars have defined environmental knowledge as environmental knowledge for issues and influence and the way for perceiving (Hines et al., 1987). With the development of environmental knowledge research, environmental knowledge also has new meanings. Environmental knowledge includes system, action-related knowledge, and effectiveness knowledge (Kaiser et al., 2008; Roczen et al., 2014), and environmental knowledge is frequent thought the fundamental component of environmental literacy; without foundational environmental knowledge, it may not be possible to make a reliable judgment on environmental issues and implement environmental actions accurately (Liu et al., 2015). Attitude refers to one's preferences, what one likes or dislikes, what one supports or opposes, and positive or negative perceptions (Petty & Brino, 2010). Environmental attitudes form a person's attitude towards protecting or using the environment, and environmental attitudes may influence subsequent environmental behaviour (Bogner & Wiseman, 2006; Gifford & Sussman,

2012). Many studies on environmental behaviours have not carefully defined environmental behaviour. Environmental behaviour is usually a class of undifferentiated behaviour (Stern, 2000). Nevertheless, some scholars have given a rough definition of environmental behaviour; that is, behaviour critical to the environment can be classified from the perspective of intention-oriented or impact-oriented. Classification from the perspective of intent means that behaviour with environmental significance is determined by motivation, and in addition to the classification of these two, it is also possible to distinguish between direct and indirect effects on environmental quality (Stern, 2000). Earlier studies tended to show that there has always been a linear relationship between environmental attitudes and behaviour; that is, environmental attitudes determine environmental behaviour, leading to pro-environmental behaviour. However, these models were quickly oversimplified, although they still exist in common sense (Pauw & Petegem, 2011). However, many educators still generally believe that telling someone to perceive in an accurate way and giving a plausible and understandable explanation will cause that person's behaviour (Krnel & Naglic, 2009). There may be a special relationship between knowledge and behaviour, but some scholars have proposed and proved that relying on knowledge alone will not make someone accept a specific behaviour (Stern, 2000). However, some scholars hold the opposite view that a lack of knowledge can be a barrier to influencing behaviour (DeYoung, 2000). The traditional and inherent EE model points out that EE knowledge-attitudes-behaviours. It is widely understood that environmental knowledge changes environmental attitudes, and environmental attitudes determine pro-environmental behaviours.

5.1.4 Teachers' Knowledge, Attitudes and Behaviours on Environment

When environmental education was emerging, some scholars had already researched teachers' environmental knowledge, environmental attitudes, and environmental behaviours. Meanwhile, Nigerian scholars surveyed local science, arts, and social sciences teachers on their environmental knowledge, attitudes, and behaviours. The attitude towards environmental protection is also relatively negative. Many teachers have heard of environmental education but are not conscious of participating in environmental education seminars and various environmental protection activities. This result may be related to the emerging degree of environmental education (Manasaray et al., 1998). However, some Greek scholars have found that the environmental education acquired by teachers is not scientific, and there is a certain misunderstanding of their cognition of environmental knowledge (Michail et al., 2007). Research in Malaysia found that teachers are highly concerned about the environment, but they have insufficient understanding of the root causes of environmental problems (Said et al., 2003). Scholars in Lebanon have conducted a comparative study on local teachers' environmental knowledge and attitudes in Lebanon and teachers in Australia. The results showed that Australian teachers generally have higher environmental knowledge than Lebanese teachers, and career threshold teachers who have a positive view of environmentally responsible behaviours tend to be more supportive of school environmental education (Vlaardingerbroek et al., 2007).

There are also studies on the environmental knowledge of biology teachers in middle schools. The results showed that secondary school biology pre-service teachers illustrated good environmental knowledge, and most teachers had the better viewpoints of environmental concepts, which may be related to the relevant education and training they received in college (Esa, 2010). Another study conducted in Israel of first-year pre-service teachers in pre-K-10 training showed limited environmental knowledge but positive attitudes towards the

environment. However, these teachers have a lower sense of environmental responsibility (Pe'er et al., 2007). Some scholars in Taiwan have evaluated teachers' environmental literacy. The research results showed that teachers' attitudes and attitudes are high, while environmental knowledge level is moderate and environmental behaviour is low. While primary school teachers in Taiwan outperformed high school teachers in assessment, this may be related to their teacher environment training and experience (Liu et al., 2015). Two studies from the United States indicated that pre-service teachers in primary schools did not have sufficient knowledge to be environmentally literate. Therefore, they suggested the need to effectively integrate EE into instructional training programmes (Amirshokoohi, 2010; Perrotta et al., 2008). Some studies suggest that pre-service teachers have a moderate attitude towards environmental issues and generally have a higher awareness of environmental issues (Buldur & Ömeroglu, 2018). Scholars in Turkey conducted research on the environmental literacy of science teachers in 34 provinces in 12 sub-regions of the country. A total of 1,182 teachers participated in completing a questionnaire on environmental literacy, including knowledge, attitudes, use, and concerns about environmental literacy. With four components, the findings showed that 77% of science and technology teachers have an adequate level of environmental knowledge, a positive attitude, a high sense of responsibility, and concern for the environment (Kahyaoğlu, 2011). These two previous studies have assessed teachers' environmental literacy, and the results have shown that teachers in primary schools lack sufficient environmental knowledge (Michail & Stamou, 2007; Spiropoulou et al., 2007). In addition, many scholars have also proposed factors that may affect teachers' environmental attitudes and environmental attitudes, such as age, gender, and parents' knowledge level. Some scholars have proposed that environmental knowledge is significantly related to gender, parental education, and knowledge level (Gambro & Switzky, 1999; Kuhlemeier et al., 1999), while the perception of environmental issues is associated with correct understanding (Dillon & Gayford, 1997).

Different studies suggest that the different ways of expressing various factors such as education level, gender, and age are likely to affect teachers' environmental knowledge (Kahyaoğlu, 2011; Ma & Bateson, 1999; Tuncer et al., 2009). While some studies have shown that males are more perceived and sensitive to environmental issues than females (Michail, 2007; Quimbita & Pavel, 1996), other researchers have found the opposite result, arguing that female teachers generally have higher environmental knowledge and environmental attitudes than male teachers (Davidson & Freudenburg, 1996; Larijani, 2010; Tikka et al., 2000). In a study evaluating the environmental literacy of teachers in Malaysia, it was found that teachers are highly concerned about the environment but lack understanding of the root causes of environmental problems. The results also showed that teachers' environmentally responsible behaviours were inconsistent with levels of attention and knowledge, and their participation in nature-related activities was lower (Aini et al., 2009).

Currently, some scholars abroad have done evaluative research on teachers' environmental literacy. However, research on teachers' environmental literacy, especially environmental knowledge, attitudes, and behaviours, in mainland China is still relatively rare. As Özden (2008) mentioned, student teachers in developing countries need more education to raise their awareness of environmental issues and help them to address them. Therefore, the present study mainly focused investigating teachers' environmental knowledge, attitudes, and behaviours in green schools (primary schools) in the capital city Zhengzhou of Henan Province in mainland China. It aimed to compare the difference of these three components in teachers between green and non-green schools to examine the implementation of the green school project. Furthermore, the difference in teachers' environmental knowledge, attitudes, and behaviours between different-level green schools and different non-green schools were investigated. Finally, the linear correlation between teachers' environmental knowledge, attitudes, and behaviours will be discussed in the study.

5.2 Methodology

5.2.1 Mixed method

The term "mixed methods" refers to an existing research method that facilitates the systematic integration or "mixing" of quantitative and qualitative data within a single survey or continuous survey programme. The basic premise of this approach is that this integration allows for more complete and synergistic use of data than separate quantitative and qualitative data collection and analysis (Creswell & Clark, 2017). The present study mainly used the mixed method for research and analysis, in which the questionnaire survey was used to measure teachers' environmental knowledge, environmental attitudes, and environmental behaviours, and quantitative research was used for the analysis.

Quantitative research systematically investigates phenomena by collecting quantifiable data and performing statistical, mathematical, or computational techniques. Furthermore, qualitative research is widely used in teachers' thinking and practice, and its purpose is to reveal teachers' opinions and voices. This is vital to understanding the theories in school education and teachers' ideas of a particular point of view (Hwang, 2009). Meanwhile, qualitative research involves studying experience as a story (Clandinin, 2006). This research mainly intended to provide an in-depth supplement to the results of the previous quantitative analysis through the interview method. There were two objectives of using qualitative research in this reported study: a) to further explore whether green schools' teachers' environmental knowledge, attitudes, and behaviours will be more positive through interviews with teachers in green and non-green schools; and b) to further explore whether environmental knowledge can affect teachers' environmental attitudes and environmental behaviours.

5.2.2 Narrative Research- 'RIVER' Allegory

Narrative inquiry is a way of understanding experience. This is also a research method. Therefore, it is not only a way of people's perception of experience phenomena but also a method of narrative exploration of experience (Ollerenshaw & Creswell, 2002). It allows for intimate and in-depth study of personal experiences over time and background. Narrative research methods allow people to talk about or write down their experiences in a naturalistic way of storytelling (Riessman, 1993). The narrative analysis method adopted in this research was to provide a storyline and analysis of the whole story by using a clear "river" allegory discovered by some previous researchers. This approach drew on the narrative research pedagogy of *Elliot Mishler*, *Jane Elliot,* and other studies in this area. To identify and explain the incidents, researchers need to study their content and form deeply, using shared information:

- the present and past (tributaries of the river) impact on other people's lives and self
- the society and background of "life," the present and the past (topography through which the river passes)
- events and experiences that the narrator considers necessary (materials carried and deposited as the river passes)

The combination of words and the way of expression (the sound and appearance of water) are of great significance. By narrating a complete storyline to show the content of the dialogue between the interviewer and the interviewee, the purpose of interview research can be described more clearly and thoroughly.

5.2.3 Instrument

This instrument was a questionnaire divided into three parts:

i) The first part of the questionnaire referred to environmental knowledge to assess teachers' possession of environmental knowledge. The questionnaire included five dimensions

about *'Ozone Layer, Green-house and Global Warming, Air Pollution, Solid Waste and Environmental Information'* for 33 questions. The answers were "Yes," "No," and "Don't Know," with 1 point for a correct answer and 0 points for wrong or unknown answers. The total score was 33.

ii) The second part was for the environmental attitudes, and the questionnaire was divided into 16 items in total, that measured teachers' attitudes toward protecting the environment on a Likert scale ranging from 1 (Strongly Disagree), 2 (Disagree), 3 (Neutral), 4 (Agree) to 5 (Strongly Agree).

iii) The third part was for the environmental behaviours, and the questionnaire was divided into 20 items in total to assess teachers' behaviours toward protecting the environment on a Likert scale ranging from 1 (Never), 2 (Seldom), 3 (Sometimes), 4 (Often) to 5 (Always).

To ensure that participants could answer the questionnaire content accurately, the researcher designed positive and negative questions for the environmental attitudes part and environmental behaviours part. However, to facilitate the final data statistics, the present study converted positive and negative questions before statistics. The questionnaire's content for the three parts of this research was derived from previous scholars Cheng and So (2015), who investigated teachers' environmental knowledge, attitudes, and behaviours regarding environmental literacy. The previous scholars have evaluated the consistency and reliability of the questionnaire items through *Cronbach's alpha.* To further determine the reliability of this questionnaire in this study, the researcher found $N = 6$ teachers from green and non-green schools who were not included in the subsequent research to complete the Pilot Test. The final questionnaire reliability results were *Cronbach α 0.86 for the environmental knowledge part, Cronbach α 0.866 for the environmental attitude part*, and *Cronbach α 0.849 for the environmental behaviours part*, which showed that the questionnaire had enough credibility

and could be used in future research. This questionnaire was retested and reliable. The content of the questionnaire is presented in the Appendix 3: Chapter 5 section.

5.3 Sample and Procedure

This research was divided into a questionnaire survey part and an interview survey part. The questionnaire survey selected four green primary schools by cluster sampling (including two provincial-level green schools and two municipal-level green schools). N = 6 teachers were randomly selected from each green school, with the total number of these four green schools being 24. Meanwhile, N = 6 teachers were randomly selected from four non-green schools and a total of 24 teachers were from four non-green primary schools, and they were all required to use the online questionnaire to complete the questionnaire survey. Among them, N = 48 teachers from green schools and non-green schools completed the questionnaire according to the requirements and guidance, and no one was absent or did not complete all of the answers for any reason.

For the interview survey, the present study used semi-structured interview questions about the teacher's background and some questions were related to environmental knowledge, environmental attitudes, and environmental behaviours. Because of COVID-19, all teachers who participated were interview surveyed using telephone interviews and the conversations were recorded through voice calls. Then, the researcher translated and analysed them verbatim. The number of samples interviewed in this research was four teachers in green schools and four teachers in non-green schools. According to the previous quantitative research results, teachers of different types of schools were grouped, and the grouping results are presented in the Results section. Before starting the research, the interview questions were set based on the interviewees' different scores on environmental knowledge, attitudes, and behaviours. Hence,

the interview length was controlled between 15 to 30 minutes. For protecting the privacy of each interviewee, all interviews were conducted anonymously, *G1, G2, G3, and G4* were used to represent the four teachers in green schools, and *NG1, NG2, NG3, and NG4* were used to represent the four teachers in non-green schools. All final interview questions will be presented in the Appendix. In the end, this research chose to use the narrative inquiry method to summarise and analyse the content of the interviews.

The present study also conducted interviews with some of the participants. To ensure the validity of the interview questions, the researcher found two teachers who were from one green school and one non-green school at the research site to complete a Pilot Test before starting the survey (These two teachers were from schools that did not belong to the further research schools). The test results supplemented and adjusted the interview questions.

5.4 Statistically Analysis

SPSS Version 26 was used for data analysis. a) *t-test* to compare the difference between teachers' environmental knowledge, attitudes, and behaviours in green and non-green schools or provincial-level and municipal-level green schools; b) One-Way ANOVA to examine the difference between teachers' environmental knowledge, attitudes, and behaviours in non-green schools; and c) Pearson correlation to explore the correlation between teachers' environmental knowledge and attitudes, environmental attitudes, and environmental behaviours or environmental knowledge and environmental behaviours.

For the interview analysis, the narrative method was mainly used, of which the "River" Allegory was the primary analysis method of this research. Finally, this research presents the

final results in the following section and interview transcript in the Appendix 5: Interview Transcript section.

5.5 Results

5.5.1 Teachers' Possession of Environmental Knowledge Comparison between Green and Non-Green Schools

First, the comparison survey was made to compare teachers' possession of environmental knowledge in green and non-green schools, respectively. The measurement of environmental knowledge component was divided into five different dimensions, namely, *'Ozone Layer, Green-house and Global Warming, Air Pollution, Solid Waste, and Environmental Information.'* The total number questions were 33. The comparison results are presented in Table 5.1.

Table 5.1 shows that teachers from green school had better performance ($p < 0.001$) on the 33 questions presented in the environmental knowledge component than teachers from non-green schools, and the total mean score were 28.875 and 23.067 for green and non-green schools, respectively.

In detail, teachers in green schools had better performance in '*Green-house and Global Warming* ($p < 0.05$), *Air Pollution* ($p < 0.001$), *Solid Waste* ($p < 0.01$), *and Environmental Information* ($p < 0.001$)*'* than teachers in non-green schools. However, there was no significant difference between teachers' performance on *'Ozone Layer* ($p > 0.05$)*'* in green and non-green schools.

Moreover, it can be obtained from *Q7*, presented in *Ozone Layer*, and *Q25*, presented in *Solid Waste* that the mean of teachers in non-green schools was higher than teachers in green schools but not significant ($p > 0.05$). (Questionnaire presented in Appendix 3 for Chapter 5 (part 3)).

Table 5.1

The Comparison of Teachers' Possession of Environmental Knowledge in Green and Non-Green Schools

Question	School Type	N	Mean	SD	F	*p-value
Ozone Layer						
Q1	Green School	24	31.68	0.204	1.412	0.561
	Non-Green School	24	30.36	0.282		
Q2	Green School	24	29.04	0.338	8.929	0.162
	Non-Green School	24	23.34	0.464		
Q3	Green School	24	33.00	1.000	109.480	0.004**
	Non-Green School	24	22.11	0.482		
Q4	Green School	24	27.39	0.381	7.393	0.190
	Non-Green School	24	22.21	0.482		
Q5	Green School	24	26.07	0.415	11.045	0.069
	Non-Green School	24	17.82	0.509		
Q6	Green School	24	33.00	1.000	184.000	<0.001***
	Non-Green School	24	10.89	0.482		
Sub-total	Green School	24	28.48	0.123	8.624	0.532
	Non-Green School	24	27.49	0.196		
Green-house and Global Warming						
Q7	Green School	24	28.71	0.338	0.874	0.645
	Non-Green School	24	29.04	0.282		
Q8	Green School	24	27.39	0.381	17.345	0.029*
	Non-Green School	24	17.82	0.509		
Q9	Green School	24	26.07	0.415	6.269	0.212
	Non-Green School	24	20.79	0.495		
Q10	Green School	24	33.00	0.000	17.889	0.076
	Non-Green School	24	29.04	0.338		
Q11	Green School	24	30.36	0.282	3.131	0.394
	Non-Green School	24	27.39	0.381		
Q12	Green School	24	33.00	1.000	10.120	0.155
	Non-Green School	24	30.36	0.282		
Q13	Green School	24	33.00	0.000	4.372	0.323
	Non-Green School	24	31.68	0.204		
Sub-total	Green School	24	29.87	0.117	1.714	0.024*
	Non-Green School	24	26.53	0.178		
Air Pollution						
Q14	Green School	24	31.68	0.204	16.030	0.084
	Non-Green School	24	26.07	0.415		

Q15	Green School	24	27.39	0.381	14.577	0.002**
	Non-Green School	24	13.86	0.504		
Q16	Green School	24	29.04	0.338	24.080	0.023*
	Non-Green School	24	19.14	0.504		
Q17	Green School	24	31.68	0.204	4.666	0.306
	Non-Green School	24	29.04	0.338		
Q18	Green School	24	33.00	0.000	69.000	0.008**
	Non-Green School	24	24.75	0.442		
Q19	Green School	24	29.04	0.338	0.650	0.690
	Non-Green School	24	27.39	0.381		
Q20	Green School	24	31.68	0.204	24.910	0.042*
	Non-Green School	24	24.75	0.442		
Sub-total	Green School	24	30.06	0.924	2.365	< 0.001***
	Non-Green School	24	23.56	0.202		
Solid Waste						
Q21	Green School	24	30.36	0.282	33.920	< 0.001***
	Non-Green School	24	12.54	0.495		
Q22	Green School	24	26.07	0.415	6.269	0.212
	Non-Green School	24	20.79	0.495		
Q23	Green School	24	27.39	0.381	0.650	0.690
	Non-Green School	24	29.04	0.338		
Q24	Green School	24	30.36	0.282	11.367	0.127
	Non-Green School	24	24.75	0.442		
Q25	Green School	24	28.88	0.381	0.650	0.690
	Non-Green School	24	29.04	0.338		
Q26	Green School	24	29.04	0.338	2.414	0.449
	Non-Green School	24	26.07	0.415		
Q27	Green School	24	30.36	0.282	17.542	0.067
	Non-Green School	24	23.43	0.464		
Sub-total	Green School	24	28.88	0.129	2.922	0.002**
	Non-Green School	24	23.56	0.202		
Environmental Information						
Q28	Green School	24	27.39	0.381	2.002	0.488
	Non-Green School	24	24.75	0.442		
Q29	Green School	24	30.36	0.282	33.920	0.016*
	Non-Green School	24	20.79	0.495		
Q30	Green School	24	29.04	0.338	13.589	0.089
	Non-Green School	24	22.11	0.482		
Q31	Green School	24	26.07	0.415	8.931	0.007**
	Non-Green School	24	13.86	0.504		
Q32	Green School	24	26.07	0.415	1.736	0.515
	Non-Green School	24	23.43	0.464		
Q33	Green School	24	26.07	0.415	11.045	0.017*
	Non-Green School	24	15.18	0.509		
Sub-total	Green School	24	27.49	0.177	0.713	< 0.001***
	Non-Green School	24	19.93	0.176		

Total	Green School	24	29.42	0.593	7.590	< 0.001***
	Non-Green School	24	23.07	0.132		

*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$

5.5.2 Teachers' Pro-environmental Attitudes Comparison between Green and Non-Green Schools

The pro-environmental attitudes questionnaire contained 16 questions on a Likert scale which ranged from 1 (strongly disagree) to 5 (strongly agree), to check teachers' negative to positive attitudes towards protecting the environment. Furthermore, the comparison survey was made to compare teachers' environmental attitudes between green and non-green schools. The results are presented in Table 5.2.

Table 5.2 illustrates that teachers from green schools had better performance ($p < 0.05$) on environmental attitudes component than teachers from non-green schools, with the means of teachers from green and non-green schools being 4.35 and 4.13, respectively.

In detail, *from Q6; Q8; Q9; Q12,* it can be obtained that teachers from non-green schools have a higher mean than teachers from green schools. However, this difference was found to be not significant ($p > 0.05$). (Questionnaire presented in Appendix 3 for Chapter 5 (part 3)).

Table 5.2
The Comparison of Teachers' Pro-environmental Attitudes in Green and Non-Green Schools

Question	School Type	N	Mean	SD	F	*p-value
Q1	Green School	24	4.38	0.647	4.842	0.032*
	Non-Green School	24	3.75	1.225		
Q2	Green School	24	4.50	0.722	0.821	0.115
	Non-Green School	24	4.04	1.197		
Q3	Green School	24	4.21	0.658	0.945	0.404
	Non-Green School	24	4.38	0.711		
Q4	Green School	24	4.50	0.780	0.543	0.332
	Non-Green School	24	4.29	0.690		
Q5	Green School	24	4.54	0.721	0.208	0.173
	Non-Green School	24	4.25	0.737		
Q6	Green School	24	3.92	0.974	1.045	0.441
	Non-Green School	24	4.17	1.239		

Q7	Green School	24	4.46	0.588	3.954	0.744
	Non-Green School	24	4.38	1.096		
Q8	Green School	24	4.21	0.721	2.006	0.257
	Non-Green School	24	3.88	1.227		
Q9	Green School	24	4.46	0.588	0.850	1.000
	Non-Green School	24	4.46	0.779		
Q10	Green School	24	4.21	0.932	0.675	0.796
	Non-Green School	24	4.13	1.262		
Q11	Green School	24	4.50	0.659	0.857	0.260
	Non-Green School	24	4.25	0.847		
Q12	Green School	24	4.50	0.722	3.821	0.645
	Non-Green School	24	4.58	0.504		
Q13	Green School	24	4.58	0.504	4.235	0.089
	Non-Green School	24	4.21	0.932		
Q14	Green School	24	4.25	0.737	0.000	0.023*
	Non-Green School	24	3.75	0.737		
Q15	Green School	24	4.29	0.624	0.230	0.009**
	Non-Green School	24	3.75	0.737		
Q16	Green School	24	4.13	0.680	0.709	0.136
	Non-Green School	24	3.79	0.833		
Total	Green School	24	4.35	0.288	2.750	0.028*
	Non-Green School	24	4.13	0.388		
*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$						

5.5.3 Teachers' Pro-environmental Behaviours Comparison between Green and Non-Green Schools

The environmental behaviours questionnaire contained 20 items on a Likert scale which ranged from 1 (never) to 5 (always), to check teachers 'How often do you do this thing for protecting our environment?'. The comparison survey compared teachers between green and non-green schools.

Table 5.3 reveals that teachers from green schools had better ($p < 0.001$) performance on the pro-environmental behaviours component than teachers from non-green schools, with the total mean of teachers from green and non-green schools being 4.19 and 3.24, respectively.

In detail, the significant difference of almost items between teachers in green and non-green schools could be obtained ($p < 0.05$). However, *in Q8; Q16; Q17*, showed that there was no

significant difference (p > 0.05) between green and non-green schools. (Questionnaire presented in Appendix 3 for Chapter 5 (part 3)).

Table 5.3
The Comparison of Teachers' Pro-environmental Behaviours in Green and Non-green schools

Question	School Type	N	Mean	SD	F	*p-value
Q1	Green School	24	4.42	0.584	1.981	0.018*
	Non-Green School	24	3.83	1.007		
Q2	Green School	24	4.04	0.806	2.308	< 0.001***
	Non-Green School	24	2.71	1.042		
Q3	Green School	24	4.17	0.702	3.012	< 0.001***
	Non-Green School	24	2.83	0.963		
Q4	Green School	24	4.42	0.717	5.785	< 0.001***
	Non-Green School	24	3.46	1.141		
Q5	Green School	24	4.46	0.779	8.110	< 0.001***
	Non-Green School	24	3.42	1.213		
Q6	Green School	24	3.67	0.963	0.682	0.004**
	Non-Green School	24	2.79	1.062		
Q7	Green School	24	4.25	0.608	0.920	< 0.001***
	Non-Green School	24	3.58	0.654		
Q8	Green School	24	4.04	0.955	2.164	0.066
	Non-Green School	24	3.58	0.717		
Q9	Green School	24	4.29	0.624	9.954	0.007**
	Non-Green School	24	3.50	1.216		
Q10	Green School	24	3.75	1.073	1.906	< 0.001***
	Non-Green School	24	2.46	1.444		
Q11	Green School	24	4.38	0.495	10.539	< 0.001***
	Non-Green School	24	3.29	1.160		
Q12	Green School	24	4.25	0.897	3.054	< 0.001***
	Non-Green School	24	2.96	1.268		
Q13	Green School	24	4.50	0.511	18.253	0.007**
	Non-Green School	24	3.71	1.268		
Q14	Green School	24	4.13	0.797	2.973	0.023*
	Non-Green School	24	3.46	1.141		
Q15	Green School	24	4.13	0.448	28.011	< 0.001***
	Non-Green School	24	3.08	1.176		
Q16	Green School	24	4.13	0.900	0.985	0.687
	Non-Green School	24	4.00	1.216		
Q17	Green School	24	4.42	0.504	4.652	0.390
	Non-Green School	24	4.21	1.062		
Q18	Green School	24	3.83	0.702	5.760	0.004**
	Non-Green School	24	2.96	1.233		
Q19	Green School	24	4.25	0.794	0.245	< 0.001***
	Non-Green School	24	3.33	0.868		
Q20	Green School	24	4.21	0.884	0.042	< 0.001***

	Non-Green School	24	1.71	0.908		
Total	Green School	24	4.19	0.354	3.444	< 0.001***
	Non-Green School	24	3.24	0.576		

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

5.5.4 Teachers' Possession of Environmental Knowledge, Pro-environmental Attitudes and Pro-environmental Behaviours Comparison in Provincial-level and Municipal-level Green Schools

To further determine whether there is difference between different level green schools, *t-test* analysis showed the results when comparing teachers in provincial-level and municipal-level green schools.

From Table 5.4, it can be concluded that the total average score of teachers in provincial-level and municipal-level green schools were 29.54 and 29.30, respectively. Among them, the sub-total average of the *Ozone layer* was 29.87 and 30.25 for teachers in provincial-level and municipal-level green schools, *Green House and Global Warming* was 30.17 and 30.12, *Air Pollution* was 30.69 and 30.12, *Solid Waste* was 29.04 and 28.71, *Environmental Information* was 4.37 and 4.33, respectively. However, there was no significant difference between teachers in provincial-level and municipal-level green schools in these dimensions ($p > 0.05$). It is worth mentioning that in *Q3; Q6; Q10; Q12; Q13,* both teachers in provincial-level and municipal-level green schools were all answering correctly. (Questionnaire presented in Appendix 3 for Chapter 5 (part 3)).

For the result of environmental attitudes and environmental behaviours components, teachers' average scores were 4.37 and 4.31 in environmental attitudes, and 4.31 and 4.14 in environmental behaviours components. However, there was no significant difference between teachers' performance in provincial-level and municipal-level green schools ($p > 0.05$) in these two components.

Table 5.4

The Comparison of Teachers' Possession of Environmental Knowledge in Different-level Green Schools

Question	School Type	N	Mean	SD	F	*p-value
Ozone Layer						
Q1	Provincial level	12	30.36	0.289	4.840	0.328
	Municipal level	12	33.00	0.000		
Q2	Provincial level	12	27.39	0.389	1.497	0.557
	Municipal level	12	30.03	0.289		
Q3	Provincial level	12	33.00	0.000	0.000	1.000
	Municipal level	12	33.00	0.000		
Q4	Provincial level	12	30.36	0.289	5.436	0.294
	Municipal level	12	24.75	0.452		
Q5	Provincial level	12	25.08	0.452	0.957	0.633
	Municipal level	12	27.72	0.389		
Q6	Provincial level	12	33.00	0.000	0.000	1.000
	Municipal level	12	33.00	0.000		
Sub-total	Provincial level	12	29.87	0.159	0.057	0.818
	Municipal level	12	30.25	0.132		
Green house and Global Warming						
Q7	Provincial level	12	27.06	0.389	1.497	0.557
	Municipal level	12	30.36	0.289		
Q8	Provincial level	12	24.75	0.452	5.436	0.294
	Municipal level	12	30.03	0.289		
Q9	Provincial level	12	27.39	0.389	0.957	0.633
	Municipal level	12	24.42	0.452		
Q10	Provincial level	12	33.00	0.000	0.000	1.000
	Municipal level	12	33.00	0.000		
Q11	Provincial level	12	33.00	0.000	13.750	0.152
	Municipal level	12	27.06	0.389		
Q12	Provincial level	12	33.00	0.000	0.000	1.000
	Municipal level	12	33.00	0.000		
Q13	Provincial level	12	33.00	0.000	0.000	1.000
	Municipal level	12	33.00	0.000		
Sub-total	Provincial level	12	30.17	0.141	1.492	0.235
	Municipal level	12	30.12	0.093		
Air Pollution						
Q14	Provincial level	12	33.00	0.000	16.030	0.084
	Municipal level	12	30.36	0.289		
Q15	Provincial level	12	24.75	0.452	14.577	0.002**
	Municipal level	12	30.03	0.289		
Q16	Provincial level	12	30.36	0.289	24.080	0.023*
	Municipal level	12	27.39	0.389		
Q17	Provincial level	12	33.00	0.000	4.666	0.306
	Municipal level	12	29.37	0.289		
Q18	Provincial level	12	33.00	0.000	11.367	0.127

	Municipal level	12	33.00	0.000		
Q19	Provincial level	12	30.03	0.289	0.650	0.690
	Municipal level	12	27.72	0.389		
Q20	Provincial level	12	30.69	0.289	24.910	0.042*
	Municipal level	12	33.00	0.000		
Sub-total	Provincial level	12	30.69	0.924	0.057	0.760
	Municipal level	12	30.12	0.202		
Solid Waste						
Q21	Provincial level	12	30.36	0.289	0.000	1.000
	Municipal level	12	30.36	0.289		
Q22	Provincial level	12	27.39	0.389	0.957	0.633
	Municipal level	12	24.75	0.452		
Q23	Provincial level	12	27.39	0.389	0.000	1.000
	Municipal level	12	27.39	0.389		
Q24	Provincial level	12	27.39	0.389	13.750	0.152
	Municipal level	12	33.00	0.000		
Q25	Provincial level	12	27.39	0.389	1.497	0.557
	Municipal level	12	30.36	0.289		
Q26	Provincial level	12	33.00	0.000	33.000	0.069
	Municipal level	12	24.75	0.452		
Q27	Provincial level	12	30.36	0.289	0.000	1.000
	Municipal level	12	30.36	0.289		
Sub-total	Provincial level	12	29.04	0.129	0.110	0.826
	Municipal level	12	28.71	0.202		
Environmental Information						
Q28	Provincial level	12	30.36	0.289	0.000	1.000
	Municipal level	12	30.36	0.289		
Q29	Provincial level	12	33.00	0.389	13.750	0.152
	Municipal level	12	27.29	0.452		
Q30	Provincial level	12	30.36	0.289	1.497	0.557
	Municipal level	12	27.39	0.389		
Q31	Provincial level	12	27.39	0.452	0.957	0.633
	Municipal level	12	24.75	0.389		
Q32	Provincial level	12	24.75	0.452	0.957	0.515
	Municipal level	12	27.39	0.389		
Q33	Provincial level	12	24.75	0.452	0.957	0.017*
	Municipal level	12	27.39	0.389		
Sub-total	Provincial level	12	27.95	0.166	0.474	0.710
	Municipal level	12	27.03	0.194		
Total	Provincial level	12	29.54	0.166	0.169	0.857
	Municipal level	12	29.30	0.194		

*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$

Table 5.5

Teachers' Pro-environmental Attitudes in Different-level Green Schools

Question	School Type	N	Mean	SD	F	*p-value
Q1	Provincial level	12	4.25	0.754	1.320	0.355
	Municipal level	12	4.50	0.522		
Q2	Provincial level	12	4.67	0.651	1.222	0.268
	Municipal level	12	4.33	0.778		
Q3	Provincial level	12	4.33	0.651	0.371	0.364
	Municipal level	12	4.08	0.669		
Q4	Provincial level	12	4.50	0.798	0.000	1.000
	Municipal level	12	4.50	0.798		
Q5	Provincial level	12	4.50	0.905	1.148	0.784
	Municipal level	12	4.58	0.515		
Q6	Provincial level	12	4.08	1.084	0.003	0.414
	Municipal level	12	3.75	0.866		
Q7	Provincial level	12	4.50	0.522	1.100	0.737
	Municipal level	12	4.42	0.669		
Q8	Provincial level	12	4.25	0.452	14.626	0.784
	Municipal level	12	4.17	0.937		
Q9	Provincial level	12	4.42	0.669	1.100	0.737
	Municipal level	12	4.50	0.522		
Q10	Provincial level	12	4.25	0.965	0.190	0.292
	Municipal level	12	4.17	0.937		
Q11	Provincial level	12	4.58	0.669	0.050	0.832
	Municipal level	12	4.42	0.669		
Q12	Provincial level	12	4.67	0.651	1.222	0.548
	Municipal level	12	4.33	0.778		
Q13	Provincial level	12	4.58	0.515	0.000	0.968
	Municipal level	12	4.55	0.515		
Q14	Provincial level	12	4.33	0.778	0.494	0.591
	Municipal level	12	4.17	0.718		
Q15	Provincial level	12	4.00	0.426	6.932	0.018*
	Municipal level	12	4.58	0.669		
Q16	Provincial level	12	4.00	0.426	14.184	0.379
	Municipal level	12	4.25	0.866		
Total	Provincial level	12	4.37	0.395	7.047	0.764
	Municipal level	12	4.33	0.131		

*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$

Table 5.6

The Comparison of Teachers' Pro-environmental Behaviours in Different-level Green Schools

Question	School Type	N	Mean	SD	F	*p-value
Q1	Provincial level	12	4.33	0.651	0.423	0.496
	Municipal level	12	4.50	0.522		
Q2	Provincial level	12	4.33	0.778	0.079	0.076
	Municipal level	12	3.75	0.754		
Q3	Provincial level	12	4.19	0.828	0.108	0.876
	Municipal level	12	4.14	0.718		
Q4	Provincial level	12	4.40	0.793	0.569	0.104
	Municipal level	12	4.48	0.669		
Q5	Provincial level	12	4.25	0.965	3.246	0.196
	Municipal level	12	4.67	0.492		
Q6	Provincial level	12	3.83	1.193	6.673	0.409
	Municipal level	12	3.50	0.674		
Q7	Provincial level	12	3.92	0.515	2.292	0.004**
	Municipal level	12	4.58	0.515		
Q8	Provincial level	12	4.00	1.044	0.114	0.836
	Municipal level	12	4.08	0.900		
Q9	Provincial level	12	4.08	0.669	0.096	0.103
	Municipal level	12	4.50	0.522		
Q10	Provincial level	12	3.75	1.288	4.068	0.257
	Municipal level	12	3.85	0.866		
Q11	Provincial level	12	4.33	0.492	0.607	0.689
	Municipal level	12	4.42	0.515		
Q12	Provincial level	12	4.08	0.900	0.602	0.374
	Municipal level	12	4.42	0.900		
Q13	Provincial level	12	4.42	0.515	0.000	0.436
	Municipal level	12	4.58	0.515		
Q14	Provincial level	12	4.42	0.793	0.621	0.072
	Municipal level	12	3.83	0.718		
Q15	Provincial level	12	4.17	0.389	0.040	0.659
	Municipal level	12	4.08	0.515		
Q16	Provincial level	12	4.00	0.953	0.149	0.508
	Municipal level	12	4.25	0.866		
Q17	Provincial level	12	4.50	0.522	1.375	0.430
	Municipal level	12	4.33	0.492		
Q18	Provincial level	12	4.00	0.853	2.200	0.253
	Municipal level	12	3.67	0.492		
Q19	Provincial level	12	3.92	0.793	0.168	0.037
	Municipal level	12	4.58	0.669		
Q20	Provincial level	12	3.92	0.900	0.348	0.107
	Municipal level	12	4.50	0.798		
Total	Provincial level	12	4.14	0.500	81.443	0.557

	Municipal level	12	4.23	0.089

*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$

5.5.5 Teachers' Possession of Environmental Knowledge, Pro-environmental Attitudes and Pro-environmental Behaviours Comparison in Different Non-Green Schools

To determine the difference between these four non-green schools, a One-Way ANOVA analysis was used to compare this difference between $N = 24$ teachers in the four different non-green schools. Among them, there were $N = 6$ teachers in School A, $N = 6$ teachers in School B, $N = 6$ teachers in School C, and $N = 6$ teachers in School D. The results are presented in Table 5.7.

Table 5.7 reveals no significant difference between the group on teachers' environmental knowledge in different non-green schools ($p > 0.05$). Teachers in School D (mean = 24.17) had the highest average score in the environmental knowledge component than in School C (mean = 23.67), School B (mean = 22.17), and School A (mean = 22.00). However, there was a significant difference between the group on teachers' pro-environmental attitudes in these four non-green schools ($p < 0.05$). Teachers in School D (mean = 4.36) had the highest average score in Pro-environmental Attitudes components than in School C (mean = 4.31), School B (mean = 3.98), and School A (mean = 3.85). In contrast, there was no significant difference between the group on teachers' pro-environmental behaviours in these four non-green schools ($p > 0.05$). Teachers in School D (mean = 3.45) had the highest score in the environmental behaviours component than in School C (mean = 3.34), School B (mean = 3.14), and School A (mean = 3.04).

Table 5.7

Teachers' Possession of Environmental Knowledge, Pro-environmental Attitudes, and Pro-environmental Behaviours in Different Non-Green Schools

Possession of Environmental Knowledge					
School Types	**N**	**Mean**	**Std. Deviation**	**F**	**Sig.**
School A	6	22.00 a	0.129		
School B	6	22.17 a	0.089		
School C	6	23.67 a	0.163	0.337	0.482
School D	6	24.17 a	0.159		
Total	24	23.07 a	0.132		
Pro-environmental Attitudes					
School Types	N	Mean	Std. Deviation	F	Sig.
School A	6	3.85b	0.261		
School B	6	3.98 ab	0.381		
School C	6	4.31a	0.429	3.197	0.046*
School D	6	4.36 a	0.266		
Total	24	4.13 ab	0.388		
Pro-environmental Behaviours					
School Types	N	Mean	Std. Deviation	F	Sig.
School A	6	3.04 a	0.712		
School B	6	3.14 a	0.756		
School C	6	3.34 a	0.269	0.590	0.629
School D	6	3.45 a	0.500		
Total	24	3.24 a	0.576		

*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$

For four different non-green schools, the same marked letter represents teachers in four non-green schools with no significant difference in the performance of possession of environmental knowledge, pro-environmental attitudes, and pro-environmental behaviours. However, different marked letters indicate the significant difference between School A, School B, School C, and School D on these above-mentioned components at $p < 0.05$.

5.5.6 Teachers' Perceptions and Experience in Their Environmental Knowledge, Pro-environmental Attitudes and Pro-environmental Behaviours

Based on the statistical analysis of teachers' environmental knowledge, pro-environmental attitudes, and pro-environmental behaviours, the interview results further showed teachers' subjective opinions on these three components regarding environmental literacy in green or non-green schools. Therefore, $N = 4$ teachers in green schools and $N = 4$ teachers in non-green schools were selected to share their experiences. Table 5.4 and Table 5.5 present the selected standard of the interviewees.

Table 5.8 and Table 5.9 present the interview group selected standard by teachers' mean score of the environmental knowledge, attitudes, and behaviours for green and non-green schools. For these three components, the average score of N = 48 teachers in green and non-green schools was 26 (a total of 33) in the environmental knowledge component, mean = 4.24 in the pro-environmental attitudes component, and mean = 3.71 in the pro-environmental behaviours component. Therefore, if each teacher's average score was equal to or higher than mean = 26, mean = 4.24, and mean = 3.71, they could be regarded as having high score on the environmental knowledge, attitudes, and behaviours components. In contrast, if teacher's score was lower than the mean score of these three components, they could be regarded as having a low score on these three components. The specific selection results are listed in the table below.

Table 5.8

Interview Group for Green School

Green School					Total
	***Environmental Knowledge**	***Environmental Attitudes**	***Environmental Behaviours**	**Course**	
G1	High 33	High 4.63	High 4.40	Science	4
G2	High 30	High 4.44	High 4.60	English	
G3	High 28	Low 3.89	High 4.45	Mathematics	
G4	High 26	Low 3.44	Low 3.35	Chinese	

*Environmental Knowledge (mean score = 26, total Score = 33); Environmental Attitudes (mean score = 4.24, total score = 5); Environmental Behaviours (mean score = 3.71, total score = 5).

Table 5.9

Interview Group for Non-Green School

Non-Green School					**Total**
	***Environmental Knowledge**	***Environmental Attitudes**	***Environmental Behaviours**	**Course**	
NG1	High 26	High 4.50	High 3.95	Science	4
NG2	High 26	High 4.56	Low 3.05	Chinese	
NG3	Low 18	Low 4.19	Low 4.15	Science	
NG4	Low 14	Low 3.69	Low 2.85	Ideology and Moral	

*Environmental Knowledge (mean score = 26, total Score = 33); Environmental Attitudes (mean score = 4.240, total score = 5); Environmental Behaviours (mean score = 3.71, total score = 5).

The present study used a narrative method to present the results of each interviewed teacher, and the results are as follows:

5.5.6.1 The Experience for One Science Teacher in a Green School (G1)

G1 was a science teacher from a provincial-level green school. He came to the school to teach in 1993 and taught courses related to natural sciences for 20 years. At that time, the school was not a green school in Zhengzhou City. According to his memory, the area and scale of the school were not as large as they are now, and there was no green school in mainland China before. After expanding the school scale and the continuous response to the green school development policy. In 2018, his school was selected as a municipal-level green school. Later, through the competition and selection with other municipal-level green schools, it finally won the title of a provincial-level green school. G1 studied biology when he was in the university, which had a lot to do with the natural science education he is currently engaged in. According to his description, the education system of primary schools in mainland China has undergone tremendous changes in the past 20 years. Science in the past was not the school's main subject, and the teaching content and textbooks were incomplete. With the requirements of the Ministry of Education and the improvement of the teaching system, the current science courses are more diverse and will cover all aspects. Among them, environmental education is also required to be integrated into the science course.

During the interview, it can be reflected that G1 is a teacher with rich teaching experience; he had a strong interest in environmental knowledge education and deep insights into environmental knowledge and environmental education. This may have something to do with his undergraduate subject. In their undergraduate biology study, he has already accepted

environmental-related studies. '*When I was in university, our courses were branched into environmental sciences and natural sciences. Our teachers would take us to nature and let us feel the importance of the environment from nature'* (interview transcript, p. 163, lines 31-33), he recalled. After the school is selected as a green school, he would take a more positive part in some environmental education activities organised by the school:

'In the context of the school, the school will hold relevant training courses on environmental education every two months. Sometimes, some professionals will be invited from outside the school. For example, some experts and environmental science professors will come to the school to set up relevant training courses and lectures. Sometimes, some workshops will be held in the school, and teachers will share the important content that we have learned in class. As teachers of science subjects, we also hold teaching seminars with other teachers every week. The topics of the teaching seminars are different each time, and we will also conduct special seminars on environmental topics' (interview transcript, p. 164, lines 18-24). *'... If it is normal teaching and research within the teaching and research group, it happens every week. Under the significant circumstance of the school, it usually occurs once a month or twice a month…'* (interview transcript, p. 164, lines 13-15).

G1 was very interested in sharing his own experiences. He was very affirmed of the importance of environmental education and environmental knowledge. He believed that environmental knowledge can effectively improve his environmental attitudes. Meanwhile, students' environmental attitudes could also be effectively improved by improving environmental knowledge. In the interview, he shared an impressive and interesting experience of activities:

'The Yellow River is the river that Zhengzhou people rely on for survival. In the early years, the pollution of the tributaries of the Yellow River was a severe problem. Therefore, the school responded to the initiative of the Environmental Protection Bureau and organised teachers and

students to participate in activities to protect the Yellow River. The activity is mainly to go to the Yellow River Museum to learn about the current pollution problem of the Yellow River. As teachers, we need to lead by example to protect the Yellow River. Therefore, we will voluntarily organise students to go to the Yellow River to clean up garbage' (interview transcript, p. 165, lines 2-9). *'...At present, the Yellow River Protection Law has been promulgated. So, relying on the mandatory requirements of the law, the pollution problem of the Yellow River will be solved to a certain extent'* (interview transcript, p. 166, lines 9-11).

From a brief introduction of G1, it could be found that his attitude towards protecting environment was very positive. He hoped to learn more about environmental knowledge and environmental information and set an example to educate students. He would take the initiative to participate in some on-campus and off-campus activities related to publicity and environmental protection. He would spontaneously and consciously do something to protect the environment. *'The green school we are now in will hold some activities that require teachers to participate. I am very interested in these activities'* (interview transcript, p.166, lines 1-2).

'I will choose green travel to reduce carbon emissions because the greenhouse effect caused by carbon dioxide is too severe, I will carry my shopping bags instead of using plastic bags because this can reduce white pollution, and I will turn off the power or turn off the lights to reduce light pollution' (interview transcript, p. 165, lines 36-39). *'... If you can do your best to protect the environment, that is also a significant thing'* (interview transcript, p. 166, lines 5-6). He replied earnestly and confidently.

Experiencing the school's transformation from a non-green school with poor conditions such as building scale to infrastructure, and it had become a green school that meets the requirements for a green building area and is among the leading standards in Zhengzhou City in all aspects.

He expressed great pride in this. However, the school had not required teachers to integrate the content related to the green environment into the class, to require teachers to integrate environment into the class, which also poses particular challenges for all teachers. However, he has always been full of confidence in this challenge because he would fulfil the policy requirements of the green school and actively integrated the environment into his class.

'There are two stages here. In the early years, I would say, we taught science before the green school competition. Natural science, including animals, and plants, of course, is also involved in environmental protection. Therefore, in our daily education and teaching process, it can be said that we consciously or unconsciously integrate environmental protection education content into daily education and teaching courses. After the school becomes a green school, on the one hand, we have such conscious action. On the other hand, we strengthen some education on environmental protection awareness' (interview transcript, p. 165, lines 18-24).

During his interview, he often mentioned words such as 'initiative' and 'interest.' He believed that actively participating in environmental protection and other public beneficial activities is an environmental behaviour that, as a science teacher, should lead by example. These activities could help him want to understand some of the problems in our current environment. Some of his behaviours and attitudes showed that he was actively trying to do meaningful things to the environment. At the end of the interview, when the researcher asked 'whether your environmental knowledge can affect your environmental awareness and your behaviours of protecting the environment', he said:

'I think it is inevitable that if you have received education about environmental protection, you will be deeply branded with the importance of environmental protection from the deep part of your mind. If you do not receive appropriate education, it will not reach such a high level in

the whole realm of thought. It will become very passive in certain behaviours, let alone change its attitude and behaviour' (interview transcript, p. 167, lines 11-15).

At present, science courses have gradually become the main subject in the class of primary school students in mainland China. Therefore, the requirements for teachers' environmental knowledge, pro-environmental attitudes, and behaviours toward protecting the environment are also stringent, and he would be guided by his interests and continue to improve his environmental literacy following the relevant requirements of the school. Furthermore, due to the unique geographical conditions of Zhengzhou City and the vast population base, coupled with the continuous progress of the city, environmental problems will also increase relatively, which requires some policies to restrain everyone's behaviour. Finally, at the end of the interview, he also mentioned that he strongly encouraged the green school project in Zhengzhou City and the entire Henan Province. G1 said *'Not only our discipline, not only our school, but now more and more people have realised the significance of developing green schools for environmental education towards protecting our environment'* (interview transcript, p. 167, lines 26-28). Therefore, the vigorous development and promotion of green schools in Zhengzhou City will considerably impact the environment.

5.5.6.2 The Experience for One English Teacher in a Green School (G2)

G2 is an English teacher in a municipal-level green school. After graduating from university in 2016, she came to teach in the school. It has been five years. According to her description, when she came to teach at the school, the school had already begun to plan to apply for a green school programme-expanding the area of green buildings, actively responding to the government's call, arranging for teachers and students to actively participate in environmental activities, etc. Therefore, the school has made many changes. And she has been studying language-related courses during her college years. Therefore, before she came to teach in the

green school, she had not been exposed to training related to environmental education. After teaching in a green school, she began to try to get in touch with related environmental education.

'I have attended relevant training since I came to our green school. Since the school requires regular exercise for leaders and teachers every year, I have been trained as a class teacher in the future. Other teachers can also participate in the training voluntarily because I am interested in it, so I will attend similar training as long as I have time' (interview transcript, p. 168, lines 19-22).

During the interview, she always showed a positive attitude. G2 has a specific understanding of the selection criteria of green schools, which shows that some policies of green schools have a certain impact on G2. Since she has not been exposed to too much environmental training before, she is very interested in learning about environmental information and knowledge. She was very interested in participating in environmental activities and environmental training organised by the school,

'…The school will hold two related environmental training courses every semester and ask teachers to hold seminars to discuss some environmental-related content. These activities are voluntary participation by teachers…' (interview transcript, p. 168, lines 26-28) *'But I am more interested, so I will actively participate in these activities of the school. In addition, the school will often invite some experts outside the school to explain environmental topics, which are carried out around environmental protection'* (interview transcript, p. 168, lines 33-35).

G2 thought these activities are profound in her life. In fact, many teachers, such as G2, only received environmental training after they came to the green school. Because they rarely have the opportunity to receive relevant environmental training in their previous learning background. G2 has shown her enthusiasm and interest in the environmental education training

during the interview. She believed that learning environmental knowledge is very important to her life and teaching. Meanwhile, she could also have a deeper understanding of existing environmental issues. The green school policy provides many opportunities for teachers to learn environmental knowledge.

'I would think that at present the country is doing plastic, the reduction is to reduce the activity of the application of plastic bags, because this is the most let I sincerely feel it is closely linked with us, because of Marine pollution from is part of a seminar, I saw many sea creatures, for example, sea turtles, sea birds, it is because we have discarded plastic garbage, When they eat them, they die horribly. And the proportion of such incidents gradually increases every year, which makes me feel shocking. So, I think we are indeed destroying the environment, and we must reduce plastic' (interview transcript, p. 169, lines 16-22).

She had a very positive attitude towards protecting the environment. She always talked about the word *'interest.'* She thought knowledge and information about the environment were exciting, so she would stimulate her awareness of protecting the environment based on her interest. This is also a standard view of many people after they have been exposed to environmental education. She is very obedient to the requirements of the green school. She will actively participate in school activities and publish her comments in school newspapers or periodicals. Although the school does not require every teacher to complete this task, her interests will make her want to do some things and behaviours to protect the environment. She thought environmental knowledge is helpful and significant for her.

'…As for my previous major, I still have a little blind spot in these aspects. Now, people's attention to the environment has also aroused my interest. The acquisition of this knowledge has given me a deeper understanding and made me feel that I should take action. Therefore, it has had a significant influence on me' (interview transcript, p. 169, lines 10-13).

According to her description, the green school requires the head-teacher to regularly organise some environmental-related activities, which can deepen students' awareness and understanding of environmental issues. She also explained her class arrangement:

'…So, it's not so easy to integrate into a traditional style. I'm going to look for some interesting extra-curricular readings on these topics based on um…wind power. Through extra-curricular reading, we can trigger analysis and discussion, teach them how to protect the environment, and see if they have the consciousness to do such a thing' (interview transcript, p. 169, lines 29-32).

It could be discovered that after she came to teach in the green school, through the requirements of the green school, she has cultivated her interest in environmental protection and a proactive awareness and attitude to protect the environment.

'I think what I do a lot is recycled things like plastic bottles. I should try to reduce such use and not consume too many plastic products. After that, the next step is to recycle it and collect it, and then we hope that the paper will not become garbage but become a recycling process. Therefore, this is what I do more in my life, and I will also pay attention to green travel. However, because Zhengzhou City has four distinct seasons, I usually choose a way of travel like a bicycle in spring and autumn to reduce carbon emissions as far as possible' (interview transcript, p. 171, lines 27-32). *'...I think it means that I may not be able to see much change on my own, but because we, as educators, can spread our message to more children, children will also influence others around them, which will have an enormous impact'* (interview transcript, p. 171, lines 35-37).

Environmental training and environmental activities have significantly changed her life. These are all due to the many related environmental training provided by the green school to teachers, allowing teachers to have a more direct and in-depth understanding of the environment and

enhance their protection awareness of the environment. Therefore, she encouraged to establish more green schools in Zhengzhou City. Finally, the researcher asked her whether her level of environmental knowledge can affect environmental attitudes and environmental behaviours, and she replied:

'I would say absolutely, because I know from my own experience and years of teaching kids that we don't know what to do until we know what to do. Just as we never knew about plastic, one plastic bag we threw away could kill a turtle. However, after we see this thing, we will start with ourselves; we will also realise that this is related to environmental protection, and we need to have such a sense of responsibility. So, I think this environmental knowledge will bring us a significant change in environmental awareness' (interview transcript, p. 172, lines 6-11).

5.5.6.3 The Experience for one Mathematics Teacher in a Green School (G3)

G3 is a mathematics teacher with 8 years of teaching experience in a municipal-level green school. She is currently a head-teacher. She came to teach in the current school in 2013. At that time, her school was not a green school. In 2016, the school applied to become a green school, but she did not feel much about this change. She argues that the green school programme is not very helpful to every teacher.

G3 had her views on the development of the green school project. She admitted that the green school project was an evident trend, but the existing green schools are in response to the requirements of the Zhengzhou government, and there is no great need for teaching. All the environmental education and related environmental training that she has experienced so far have been completed at the school's request after she came to the green school. Before this, she was not interested in receiving knowledge and information about the environment. In other

words, she is not very interested in environmental education training, but she would also do something following the school's requirements.

'The school will use the holiday time, for example, National Day, winter and summer vacations, to provide relevant environmental training for teachers, and all head-teachers of a class must participate. It wasted a lot of my time' (interview transcript, p. 173, lines 29-31). *'...Mathematics as the main subject has many tasks to be completed, if you go to participate in such activities or some training courses, this is a great waste of time for teachers, but there is no way'* (interview transcript, p. 174, lines 25-27). *'... I don't think it's very effective for teachers because it seems to be a kind of method stipulated by the education bureau, but, in our daily life, we can't follow it completely'* (interview transcript, p. 174, lines 30-32). *'... I am not interested in such environmental content…'*

She disagreed with some arrangements for green schools. Although green schools play a role in promoting sustainable development in environmental protection, some aspects are not perfect. She also put forward her views on these unsatisfactory places. When the researcher asked 'whether she would integrate green education or environmental education into her class, she used two simple and short words to show her attitude.

'Hardly any' (interview transcript, p. 175, line 14). *'... However, as a head-teacher, Students will be given knowledge about the educational environment. We have a class meeting once a week, and the theme of the class meeting is different every time. Maybe once a month, if we're talking about the environment, we might have a class meeting about the environment'* (interview transcript, p. 175, lines 21-24).

As introduced at the beginning, she was a typical teacher who was not interested in environmental education and green school policies because she felt that the schedule of these activities would delay her regular teaching and rest. Therefore, she kept the negative attitudes

during the process of the interview. Based on her own description, she was not very concerned and satisfied with such arrangements in her school. But to obey the school's arrangements, she had to make changes for herself, and she also felt that some selection criteria of the green school project were not very reasonable. Although she would not take the initiative to participate in some environmental protection activities, she would still make some contributions based to the government.

'I think some school policies do not seem to be able to protect the environment. For example, the planting area of vegetation in green schools must reach 37% or more, which many schools cannot achieve. Moreover, the water resources used to irrigate this vegetation are not recyclable, which will largely cause more water waste. Of course, this is only my personal opinion' (interview transcript, p. 178, lines 8-12). *'... If there is a requirement from the government, such as garbage sorting, I may share it with you. But you said deliberately to do something to protect the environment; I seem not. Not too deliberately'* (interview transcript, p. 177, lines 6-8).

According to her situation, it could also learn that some selection standards of the green school project need to be improved. Although green schools have made apparent contributions to promoting environmental education, there are still some drawbacks to them. G3's performance in environmental attitudes and behaviours toward protecting the environment is relatively negative, however, she still has learned a lot of relevant environmental knowledge and information through some training in the school. At the end of the interview, the researcher asked her *'Do you think that learning environmental knowledge can improve your environmental attitudes and environmental protection behaviours?'*

She said, *'I don't think so. I think I'm generally a little bit more rational, and I think if I do something that will be particularly good for the environment, I might do it. But if it's something*

that I think I'm doing very little, or if it's the other way around. It's probably not going to have an outstanding impact on the environment; I probably won't do it. Let me give you an example. For example, the current government will promote some electric cars. The publicity is to do green energy for environmental protection. But in my opinion, if you generate electricity now mainly from thermal power, I think you will produce more waste gas. So, I don't think it will improve the environment very much' (interview transcript, p. 177, lines 22-29).

5.5.6.4 The Experience for One Chinese Teacher in Green School (G4)

G4 is from the municipal-level green school. He is a Chinese teacher and studied Chinese and literature from undergraduate to postgraduate. Since graduating in 2000, he has been engaged in language education and has more than 20 years of teaching experience. He came to the school to teach after graduating from university and experienced turning the school from a non-green school to a green school and was deeply impressed by it. Although he has not been exposed to environment-related education and training in his previous study career, he is also one of the beneficiaries of the contributions and changes made by the school in applying for green schools in the past ten years.

This school started to apply for a municipal-level green school in 2017. Before this time, G4 had not received relevant environmental education training. It is difficult for a liberal arts teacher to receive environmental education in his previous learning background. However, the changes and arrangements made after the school applied to become a green school allowed him to be exposed to environmental education training and participate in related activities.

'Because I have always been a liberal arts student, I did not receive environmental education before the school became a green school, and I did not have the opportunity to be exposed to environmental education' (interview transcript, p. 179, lines 16-18). *'...After the school becomes a green school, it will arrange environmental education courses for all teachers once*

a week and arrange environmental protection activities once a month. The purpose is to cultivate everyone's behaviours to protect the environment' (interview transcript, p. 176, lines 21-23).

G4 obeyed the requirements of the green school project. He would participate in the activities organised by the school as required and arrange some content in his class according to the school's requirements. These requirements are also a challenge for him.

'Actually, there is no such a requirement concerning Chinese subjects' (interview transcript, p. 181, line 12).

'Because I am a Chinese teacher, there will be texts about environmental protection in the textbooks. I will play some documentary clips for students according to the content of the texts. Without affecting the progress of my normal teaching, I will still deliver more according to the content of the books. Because I have only learned some environmental knowledge recently, so I will only focus on my course content when the school does not require it. After all, it is challenging to teach content that has nothing to do with my subject' (interview transcript, p. 181, lines 4-9).

His experience also represented some teachers in green schools. He would do his best to complete some environmental protection activities arranged by the school under the requirements. However, according to his description, the factors required by the school dominate, and it takes longer to train if you are willing to participate. G4 has not had enough time to participate in some environmental activities held outside his school; some activities organised by schools make G4 impressed.

'It's impressive that there is training in this environment. This well just like we protect such a project of Yellow River, but also because we are on the coast of the Yellow River in Zhengzhou City, so governance of water pollution and water is very important for us, so our school will

make us go to the Yellow River to pick up the rubbish, let the students as much as possible to come into contact with the Yellow River, Know why the Yellow River is called the Yellow River, it is now some of the pollution problems is what, we hold these activities, and we learn from this knowledge, told us that we should go to protect our mother river, can because protect our mother river is also benefit our human beings' (interview transcript, p. 182, lines 18-25). *'…The protection of the Yellow River activities will let me know how not to waste as much as possible in the river so that our environment will have a certain impact'* (interview transcript, p. 183, lines 28-30).

He argued that environmental attitude is a very abstract concept, and only a high level of thinking can be done to protect the environment. But unfortunately, his answers and performance showed that he did not have a solid awareness to do a lot of environmental protection behaviours. But for some simple things to protect the environment, he would do his best.

'For example, when I leave home, I'll conveniently give unplug my charging power supply, then because it won't let go to waste a lot of electricity. I don't want to cause a lot of light pollution, and I would choose to turn off the lights, turn off unused lights, or see people throw rubbish. I went to stop him spitting at the meeting such a behaviour. Umm…I have to stop him at the meeting. Because we don't want him to contaminate our environment. I would tell him how to classify garbage as recyclable or unrecyclable. These are also based on the environmental training I learned later in school' (interview transcript, p. 186, lines 21-29).

Although he was constantly improving himself following the school's requirements, he would also consciously take some actions to protect the environment. When the researcher asked him *'Do you think that learning environmental knowledge can improve your environmental attitudes and behaviours',* he said, '*I think it's still a little influential, because as a Chinese*

teacher, I always believe that knowledge can change people's awareness, and awareness can change people's behaviours. The more you know, the more you know how to do these things. This is relevant' (interview transcript, p. 183, lines 36-38). *'...After teaching in this school, I find I get more interested in and want to learn about the environment, and I think doing something to protect the environment is what I should do. I am also a teacher, and I should set an example to do these things because I think these behaviours may influence my students'* (interview transcript, p. 184, lines 9-12).

However, his environmental attitude was not very positive during the interview, it can be obtained from his answer that he is encouraging the development of the green school project, because it can make an outstanding contribution to the sustainable development of the environment.

5.5.6.5 The Experience for a Science Teacher in a Non-Green School (NG 1)

NG1 is a science teacher in one primary school. After graduating from the university, she came to teach at this school for five years. Her school is a very high level of teaching in Zhengzhou City. It is understood that the school currently has no plan to apply for a green school, but she has a keen interest in environmental education and environmental knowledge. Although she has been studying computer science during her undergraduate study stage and has not studied environmental education during her learning experience, she has always maintained a high degree of interest in environmental issues, which is commendable.

'I will always pay attention to the information and content in this area and take part in some related public welfare activities. I think this has an impact on my life. These public welfare activities can let me learn more about environmental knowledge and the existing environmental problems and enable me to do things that protect the environment practically and feasibly' (interview transcript, p. 185, lines 27-31).

Since the green area cannot meet an essential requirement of a green school, many primary schools in Zhengzhou City are not yet able to participate in the green school project, teachers and students have fewer opportunities to learn about green education and environmental education. Therefore, teachers like NG1 who have time to pay attention and willingly participate in some environmental protection activities are very active and positive in their environmental attitudes. Although the school does not require teachers to do these, NG1 always leads by example and integrates environmental protection into her life.

'As a science teacher, even if the school does not require me to integrate environmental topics into my class, I will incorporate some environmental protection elements into my class, such as protecting marine life and protecting pufferfish. I will show some related documentaries in class and share my experience participating in some activities with my students' (interview transcript, p. 186, lines, 11-15*). '...I will actively encourage students to create some novel things like lanterns by using waste*' (interview transcript, p. 186, lines 20-21).

'...I think these environmental education activities and courses are beneficial to teachers and students' (interview transcript, p. 186, lines 27-28).

As a science teacher in a non-green school, NG1 has a very positive environmental attitude toward protecting our environment. During the interview, she has shown a high degree of recognition for environmental education. Although non-green schools do not require teachers of science courses to offer lectures on environmental topics or integrate environmental topics into the class, NG1 is not limited to the content of books. She will also use diversified educational methods to ingeniously integrate the current environmental issues into her class. These are also the personal intentions of NG1.

Based on the conversation, it can be observed that NG1 would actively and enthusiastically share the environmental activities she has participated in. What impressed her most was,

'One of the things that impressed me was the fact that soil desertification was severe in Mongolia or the border areas in China. That led to many years of dust storms. I also experienced sandstorms when I was living in Beijing, and the pollution was severe. It was only after the pm2.5 was defined, and we continued to control and protect the environment that the phenomenon was improved' (interview transcript, p. 186, lines 1-5).

NG1 is not only a teacher with high environmental attitudes, but her attitudes toward protecting the environment is also gradually affecting her environmental behaviours to protect the environment.

'I think I can do everything within my power, such as reducing plastic bags, reducing straws in the future, and re-using many things, such as drinking less bottled water' (interview transcript, p. 187, lines 34-36). *'…I do these things for reducing white pollution. Umm... White pollution is too severe. This is what I find pretty shocking; even in many places, you can see these plastic bags flying around. In addition, as far as I know, plastic is tough to degrade, and it may not be corrupted for hundreds of years underground, so I think this is a terrible thing'* (interview transcript, p. 188, lines 5-8).

Through the conversation, NG1 was a positive person for the environment. NG1 encouraged schools to apply for being the municipal-level green school because she hoped to change the current living environment through the green school project and let the environment achieve the goal of the sustainable development. Finally, when the researcher asked NG1 '*Do you think environmental knowledge can improve your environmental attitudes and behaviours?'*

She answered, *'I think it will have an impact. Umm… When I know the source of the environmental problem or the hazard, I will consciously want to make changes. And the source of this knowledge can change your mind, allowing you to make judgments and cultivate some environmental behaviours'* (interview transcript, p. 188, lines 23-26).

5.5.6.6 The Experience for a Chinese Teacher in a Non-Green School (NG 2)

NG2 is a Chinese teacher from a critical primary school in Zhengzhou City. She currently has seven years of teaching experience. Her undergraduate and postgraduate subjects were Chinese language and literature; therefore, she is a typical liberal arts teacher. However, her teaching experience is very diverse. Before engaging in language education, NG2 also worked part-time as an art teacher during her studies, and after graduation, she went to teach at the school where she is currently employed. She did not have any environmental education background at all, and until now, she has not received formal environmental education or training in environmental aspects. However, her school will hold one or two environmental activities every semester for teachers and students to participate.

'…Our school will organise 1-2 activities like environmental protection every semester. This is in response to the requirements of the Education Bureau. For example, the teachers and students at the school will carry out picking activities. We will also take the students to the community to pick up trash and recycle the used newspapers' (interview transcript, p. 189, lines 25-28). *'…The current students are not so strong in environmental awareness, which requires us as primary school teachers to lead them to carry out some environmental protection activities to improve their understanding of environmental protection'* (interview transcript, p. 190 lines 1-3).

NG2 was like most other teachers in non-green schools, because their subjects had no relevant with the environmental education and the school has no mandatory requirements for them to get relevant training. But NG2 still felt that environmental education is critical. Therefore, she would actively incorporate knowledge of environmental protection into her class, even if the school does not have relevant requirements.

'Although the school does not have relevant requirements, because I am a Chinese teacher, there are many textbooks related to the environment. I will combine these texts and my own experience to spread relevant environmental knowledge to my students without delaying the progress of the course' (interview transcript, p. 190, lines 9-12).

During the interview, the description from NG2 that her school intends to apply for a municipal-level green school, but has not yet moved forward due to some restrictions. She expressed some regrets about this. However, it could be discovered that she had a confident environmental attitude through her answer. She would selectively participate in some environmental protection activities and would also take the initiative to do something to protect the environment. She said:

'I am very interested in participating in some environmental protection activities, for example, the school's Arbor Day activities; I will also participate in some outing activities. Teachers will be very interested, but students are also very interested in these activities' (interview transcript, p. 190, lines 26-28). *'...I might do something simple, but I would do something like, when I go shopping, maybe there are more plastic bags now, I might use that biodegradable plastic bag or paper bag, or I might use that canvas bag by myself. Personally speaking, I am also considering changing into new energy vehicles as much as possible in the future, which may be better for the environment*' (interview transcript, p. 192, lines 23-27).

The requirements also did many environmental protection behaviours that she did. No matter whether it was voluntary or not, NG2 still showed obedience and approval. When asked NG2 *'Do you think environmental knowledge can improve your environmental attitudes and behaviours'*, she said:

'...I think it will have an impact. I know what happened before I knew what to do. If I don't know the information, I will not be able to think of a solution to the problem, so I think it still

has a certain relationship. Moreover, environmental education can indeed be of great help to the next generation. This is a matter of benefit to society' (interview transcript, p. 192, lines 19-23).

Although NG2 did not have a deep understanding of the green school project, NG2 has shown some interests in the environment. Finally, she also expressed her hope that her school could apply for being the municipal-level green school so that they can all be the most direct beneficiaries.

5.5.6.7 The Experience for a Science Teacher in a Non-Green School (NG 3)

NG3 is a science teacher in one primary non-green school. Before teaching science, she was constantly engaged in Chinese education, but as science courses gradually developed into the main subject in primary schools, NG3 had to be asked to be a science teacher by the school. But before NG3 engaged in natural science education, she had not received any training related to the environment and natural sciences. She has been studying courses in the direction of literature education. Therefore, this is a massive challenge for her, who has no relevant teaching background at all. But science is gradually becoming a significant subject, so many primary school teachers have transferred from teachers of other subjects to becoming teachers of science. This has also become a trend in some schools in mainland China.

Although NG3 received environmental training after becoming a science teacher, she had worked hard to improve her environmental knowledge. She will actively participate in the training of science teachers organised by the school.

'…The school will organise some environmental training specifically for us, mainly in teaching' (interview transcript, p. 194, lines 24-25).

'...As a science teacher, I feel that I have the responsibility and obligation to learn more information related to the environment to better educate my student' (interview transcript, p. 194, lines 29-30).

Her attitude towards being a teacher of natural sciences was very positive.

According to her description, she would often participate in environmental protection activities organised by the school. In addition, the school will regularly carry out related environmental protection activities under the arrangements of the Education Bureau. NG3 will participate as required. This also reflects her determination and willingness to work hard to improve herself, but it may be that NG3's experience as a natural science teacher is slightly lacking. Therefore, she still focused on the school rather than doing things voluntarily. Moreover, these activities did not make her feel deeply impressed.

Although NG3 was completing her work as required, she was also interested in environmental knowledge and information. She said,

'I am very interested in participating in environmental protection activities organised by the school. I think because I am a teacher, I should lead by example to better affect students. But I may not participate in activities related to the publicity environment outside the school, because now I still need to improve myself more, and may not have time to participate in other activities' (interview transcript, p. 195, lines 33-37).

When the researcher asked NG3 'she was interested in integrating environmental education into her class', she replied, *'I still follow the relevant knowledge taught in the textbooks. If I take the initiative to integrate environmental education, I may not be able to because my environmental knowledge may need improvement. If I accumulate to a certain level, I am very interested in making the class content more vivid'* (interview transcript, p. 195, lines 16-19). NG3 regarded her teacher responsibilities and role as very important. She will do her best to

improve her class and learn more about the environment, and she will also do a lot of environmental protection behaviours,

'Protecting the environment is the responsibility of each of us (interview transcript, p. 196, line 25) *... As a teacher, I hope that my behaviour can greatly affect my students. For example, I will tell people around me not to use wastewater resources. I will also turn off the power supply when I don't use it and don't litter the garbage.'* (interview transcript, p. 196, lines 29-31).

These behaviours of NG3 could also show that she attached great importance to protecting the environment. Finally, when the researcher asked her '*Do you think that learning environmental knowledge can improve your environmental attitudes and behaviours?',* she replied,

'Definitely' (interview transcript, p. 197, line 35). *'... I feel that the impact is not great, because even if this awareness and behaviours do not have environmental knowledge as a pavement… However, these environmental problems have penetrated our lives, and we know we need to do something to change our environment. In other words, we subconsciously also do something to protect the environment'* (interview transcript, p. 196, lines 37-38, p. 197, lines 1-2).

5.5.6.8 The Experience for an Ideology and Moral Teacher in a Non-Green School (NG 4)

NG4 is a teacher of the ideological and moral subject. After graduation, she came to the school to work, and NG4 studied the Chinese language and literature at the university. Whether in school or after work, NG4 has not been exposed to relevant training on environmental education, and her school does not explicitly provide relevant training for teachers. Therefore, she was a typical teacher who does not understand environmental education, and NG4 was not very interested in environmental information and environmental issues.

'I have not participated in any environmental training before, because I am an Ideology and Moral teacher, the school does not have relevant requirements, and I have not been exposed to these, but I think it is still advantageous' (interview transcript, p. 198, lines 6-9).

NG4 rarely participates in activities related to environmental publicity and environmental protection. Therefore, during the interview, she was not optimistic about environmental issues. Like many teachers in other subjects, they may have heavy tasks in their subjects. Therefore, they do not have enough time to participate in related activities. Although she was not very interested in environmental knowledge and activities to promote environmental protection, she would also do some behaviours in her own life to protect the environment because of the teacher's role and responsibilities.

'I think I can take part in some outdoor activities. Maybe we can see the protection of some rivers to understand how rivers can be protected. We can go to the place and learn the related knowledge, which I think will be more vivid' (interview transcript, p. 198, lines 6-8).

'...The simplest is to turn off the lights and turn off the faucet. I also remind people around me not to waste water resources because we all know that some resources are not renewable. So I still have these simple environmental attitudes' (interview transcript, p. 200, lines 6-9).

NG4's approach also represents some groups. For example, she would do things within her capacity, but she lacked an understanding of environmental knowledge and was not interested in understanding these things. During the interview, NG4 did not fully understand the green school project in Zhengzhou City. And these performances may have a particular relationship with her teaching background and academic background. In most cases, the ideological and moral courses taught by NG4 cannot be related to the environment. Therefore, NG4 would not consider integrating environmental knowledge into her class.

Finally, when the researcher asked NG4 'Do you think that knowing environmental knowledgecan improve your environmental attitudes and your behaviours of protecting the environment?'

NG 4 also answered, *'Well. Because I don't know it very well. Umm… I feel that it may have a certain impact. Maybe the more a person knows, the more he may change his awareness and behaviours, whether environmental or other aspects'* (interview transcript, p. 200, lines 22-24).

5.6 Discussion

5.6.1 The Comparison of Teachers Possession of Environmental Knowledge, Pro-environmental Attitudes, and Pro-environmental Behaviours in Green and Non-Green Schools

Since the early development of environmental education in the 1990s, some scholars have researched environmental knowledge, attitudes, and behaviours regarding teachers' environmental literacy (Aini et al., 2009; Buldur & Ömeroglu, 2018; Cheng & So, 2015; Davidson & Freudenburg, 1996; Desjean-Perrotta et al., 2008; Dillon & Gayford, 1997; Kahyaoğlu, 2011; Larijani, 2010; Liu et al., 2015; Ma & Bateson, 1999; Michail et al., 2007; Pe'er et al., 2007; Said et al., 2003; Tikka et al., 2000; Tuncer et al., 2009). At present, the current research mainly measured and examined teachers' environmental literacy. Previous research examined teachers' environmental literacy and found that teachers' environmental knowledge and attitudes were significantly negative, which may be caused by many teachers having little knowledge of environmental education (Manasaray et al., 1998). The research results of some scholars also indicated that teachers' environmental attitudes were high, but the environmental knowledge level was moderate (Ajiboye & Audu, 1998; Aini et al., 2009; Liu et al., 2015; Mansaray, 2009; Tuncer et al., 2009). Research in Malaysia demonstrates that teachers are highly concerned about the environment and have a good attitude towards it, but they have insufficient understanding of the root causes of environmental problems (Said et al., 2003). There are also studies on the environmental literacy of preschool teachers. The results

show that preschool teachers have moderate attitudes toward environmental issues and generally have a high awareness of environmental issues (Buldur & Ömeroglu, 2018). However, most of the existing research are evaluative studies on the environmental knowledge, attitude, cognition, and behaviours of teachers' environmental literacy. Furthermore, the results of most studies show that teachers with good environmental education have more positive performance in environmental knowledge, attitudes, and behaviours (Aini et al., 2009; Buldur & Ömeroglu, 2018; Liu et al., 2015; Mansaray, 2009; Manasaray et al., 1998; Tuncer et al., 2009).

However, differing from previous studies, the present study aimed to compare the environmental knowledge, attitudes, and behaviours regarding teachers' environmental literacy between green and non-green schools within the green school project in Zhengzhou City. The current study is similar to the comparative study of teachers' environmental literacy on Lebanese and Australian teachers (Vlaardingerbroek et al., 2007) and a comparative study on Iranian and Indian teachers (Larijani et al., 2009). The research results indicate that teachers from green schools have better performance on environmental knowledge, pro-environmental attitudes, and pro-environmental behaviours than teachers from non-green schools. Therefore, it firstly proposed that it may have a certain relationship with the selection criteria and policies of green schools through the data analysis. As abovementioned, green schools will regularly hold environmental education training, and related environmental protection activities for teachers and encourage and require teachers to actively participate. In addition, green schools will examine teachers' environmental literacy by questionnaires related to the New Environmental Paradigm (NEP) content to examine the implementation of environmental education on teachers regularly. A review of the relevant literature suggests that assessing the environmental literacy of school teachers can provide valuable information for detecting the status of EE in schools (Aini et al., 2009). Therefore, teachers from green schools are more

familiar with environmental education, and their performance on these three components is higher than teachers from non-green schools. Thus, the current findings were consistent with environmental education effectively improve environmental knowledge and attitudes (Alam, 2017; Norries & Juliet, 2016). However, teachers from non-green schools are without relevant environmental education training and measures. As some scholars previously mentioned, any effective EE programme for teachers allows them to develop environmental knowledge and commitment (Seligman et al., 2009). Therefore, teachers in green schools who are provided with environmental education training will have higher performance in environmental knowledge than teachers in non-green schools who are not provided with environmental education. Meanwhile, teachers reported they are also more positive in their pro-environmental attitudes and pro-environmental behaviours by being regularly required to participate in green schools' training and activities. This result is consistent with Liu (2015) who proposed that teachers' higher environmental literacy may be related to their teacher environmental training and experience. In contrast, those who have never participated in any EE activity should have poor performance in environmental literacy.

From the comparison results between green and non-green schools, schools, especially green schools, should regularly provide an examination of environmental literacy for students and teachers, as environmental literacy is a goal and a sign of environmental education (Franzen, 2017; Igbokwe, 2016; Kaya & Elster, 2018; Spinola, 2015), especially to examine teachers' environmental knowledge. As some scholars have mentioned, environmental knowledge is often considered the fundamental component of environmental literacy. Without foundational environmental knowledge, one was impossible to make a reliable assessment on environmental issues and implement environmental actions accurately (Liu et al., 2015). Environmental literacy is not only a development policy of green schools in Zhengzhou City based on

environmental education construction (Zhengzhou Education Bureau, 2020) but also a tool for testing environmental education (NEEAA, 2015).

The interview results further confirmed the data analysis results; teachers from green schools can participate in the environmental education training organised by the school's requirements, and they affirm the importance of environmental education training and environmental knowledge. However, whereas teachers from non-green schools also affirmed the importance of environmental education, except for science subjects, teachers from other subjects are without thorough environmental education training. Interestingly, teachers of different subjects have very different attitudes towards the green school project. For example, G1 and G2 from green schools have excellent environmental knowledge, attitudes, and behaviours. G1 Based his background in biology subjects at university and sufficient interest in environmental knowledge and related environmental activities. Therefore, G1's environmental knowledge, attitudes, and behaviours are more optimistic, while G2 actively responded to green schools, obeyed the requirements, and continued to perform more actively in these three components under later training. On the other hand, G3 just obeyed the school's arrangement. Although she had acquired enough environmental knowledge through the schools' environmental education training, she did not have a positive attitude to face environmental issues. What is worth mentioning is that although G4 has high environmental knowledge, she is somewhat dissatisfied with some measures and regulations of green schools. Her negative attitude shows the irrationality of this regulation, arguing that excessive vegetation cover will accelerate the waste of water resources. This also provides a sound opinion for the selection criteria of green schools. While G1 and G2 will actively integrate environmental knowledge into their classrooms, they believe that their awareness and behaviours can affect the behaviours of students, which is similar to some research results presented that if teachers have a positive attitude toward the environment, their students will have a positive attitude, and they will

automatically be aware of the environmental issues (Özden, 2008; Turner et al., 2009). In contrast, teachers from non-green schools are more negative in these three previously mentioned components. NG1 has a high reserve of environmental knowledge due to his disciplines and educational background. His interests and the subjects he teaches require him to accumulate environmental knowledge and voluntarily improve his environmental attitudes and behaviours. NG2 has high environmental knowledge and attitudes, but she does possess some behaviours to protect the environment according to the regulations. Also, NG2 has a strong interest in environmental knowledge, which may be related to her academic background because she has not received environmental training at university. Hence, she wants to know more about the environment. Although NG3 is a science teacher, the role of a science teacher in non-green schools seems to be less critical, and she transferred from being a Chinese teacher. Influenced by her academic background, her environmental knowledge reserve is fragile, but she actively fulfills her teacher's responsibilities and obligations, believing that she can better educate students by receiving environmental education and accumulating environmental knowledge. The result of NG3 is consistent with what Nagara (2010) mentioned, that the teacher plays an essential role in educating students, especially regarding issues and solutions related to the environment; for this, teachers should have the necessary level of environmental education awareness. NG4 shows a negative attitude toward environmental education and green schools project based on her educational background, the type of school she teaches at, and the subjects she teaches. However, the interview results reveal that teachers from green and non-green schools, educational backgrounds, and subjects significantly impacted their environmental knowledge and attitudes. For example, teachers with biological backgrounds and teachers teaching science subjects had a very high level of environmental knowledge. Meanwhile, their environmental attitudes and environmental behaviours are also positive. The current result is consistent with the previous research findings that pre-service biology teachers

have a high level of environmental knowledge, science and technology teachers have very positive environmental knowledge levels, environmental attitudes, and environmental behaviours, which have a specific relationship with their academic background and education received (Esa, 2010; Kahyaoğlu, 2011).

In addition, even though G3 is somewhat dissatisfied with the strict requirements of green schools, it is worth mentioning that G3, like the teachers at other green schools, affirmed the significance and importance of environmental education in the green school project in Zhengzhou City. Meanwhile, G3 also believes that the evolution of the green school project is a trend in the future. Teachers from the other green schools also encouraged the development of the green school project. From the attitudes of green school teachers, it can be perceived that the green school project has much influence on the teachers in the school. Therefore, the interview results further affirmed the feasibility of implementing the green school project in Zhengzhou City.

5.6.1.1 Teachers' Possession of Environmental Knowledge, Pro-environmental Attitudes, and Pro-environmental Behaviours in Different Types of Schools

Many scholars have explored and discussed the current factors that may affect teachers' environmental literacy in the existing research. Some research discovered that environmental knowledge is obviously concerned in gender and parents' education and knowledge level (Gambro & Switzky, 1999; Kuhlemeier, 1999). However, many studies frequently report gender differences in teachers' environmental literacy (Cutter et al., 2003; Larijani & Yeshodhara, 2008; Tuncer et al., 2009); gender, educational background, or parental education level have an impact on the perception and correct understanding of environmental issues (Dillon & Gayford, 1997). Some research has also presented that men have higher awareness and sensitivity to environmental issues than women (Michail, 2007; Quimbita & Pavel, 1996),

while other researchers have discovered the opposite result, arguing that female teachers' environmental knowledge and environmental attitudes are generally higher than male teachers (Davidson & Freudenburg, 1996; Larijani et al., 2008; Tikka et al., 2000). In addition, the different ways in which factors are represented are likely to affect teachers' environmental knowledge (Kahyaoğlu, 2011; Ma & Bateson, 1999; Tuncer et al., 2009).

However, differing from previous research, the present study has considered and compared different types of schools, namely, green schools (provincial-level green schools vs. municipal-level green schools) and non-green schools. The results demonstrated that there was no significant difference ($p > 0.05$) between teachers' environmental knowledge, pro-environmental attitudes, and pro-environmental behaviours from green and non-green schools. Therefore, the current study has argued that the result might be caused by the selection criteria, policies, and standards of the green school project in Zhengzhou City. As previously mentioned, provincial-level and municipal-level green schools have similar selection criteria in Henan Province. Each green school must first achieve the selection criteria of municipal-level before it can compete with other municipal-level green schools in Zhengzhou City and other municipal-level green schools in Henan Province to be awarded with the provincial-level title (Zhengzhou Education Bureau, 2021). Therefore, the selection criteria of municipal-level green schools are the basis, and teachers can obtain the same level environmental education no matter in provincial-level and municipal-level green schools. Only those who can achieve the essential criteria and can develop continuously are eligible for the title of provincial-level green schools. Furthermore, the green school project provides teachers with environmental education training and regularly examines their environmental literacy by questionnaire in municipal-level and provincial-level green schools. Thus, with the exact requirements in Zhengzhou City's municipal-level and provincial-level green schools, there was no significant difference found between teachers' environmental knowledge, attitudes, and behaviours.

Differing from teachers in green schools, although there was no significant difference between teachers' environmental knowledge and pro-environmental behaviours ($p > 0.05$) in the four non-green schools, their pro-environmental attitudes ($p < 0.05$) were different. Among them, the teachers in School D had the highest score in these three components regarding environmental literacy. The present study argues that non-green schools cannot provide teachers with environmental education training and activities; only some teachers who teach science courses or have relevant education backgrounds can know about many environmental issues. Therefore, their lack of some environmental knowledge and environmental knowledge cannot be affected in different non-green schools. Furthermore, even if some teachers do not have enough environmental knowledge, they positively affect environmental issues. Meanwhile, depending on the different teaching levels of each non-green school, teachers with higher teaching levels may have more positive environmental attitudes. Finally, teachers in School D had the highest score on environmental knowledge, attitudes, and behaviours than in the other three schools. Because School D is preparing to apply as a municipal-level green School, it provides teachers with some environmental education training based on the green school policy and selection criteria. Furthermore, School D examines teachers' environmental literacy regularly to assess the implementation of environmental education in the school. Therefore, teachers can receive more opportunities to keep in touch with environmental education and environmental literacy, which is why teachers in School D performed well in these three components.

5.6.2 The Linear Correlation between Teacher's Environmental Knowledge, Pro-environmental Attitudes, and Pro-environmental Behaviours in Green Schools and Non-Green Schools

The Pearson Linear correlation analysis was conducted to explore the correlation between teachers' environmental knowledge, pro-environmental attitudes, and pro-environmental behaviours from green and non-green schools.

Table 5.10 demonstrates a negative and insignificant correlation between teachers' environmental knowledge and pro-environmental attitudes (r = -0.026, p > 0.05), or environmental knowledge and pro-environmental behaviours (r = -0.246, p > 0.05). In contrast, the correlation between pro-environmental attitudes and pro-environmental behaviours (r = 0.455, p < 0.001) was found to be positive and significant.

Table 5.10
The Pearson Linear Correlation between Teachers' Environmental Knowledge, Pro-environmental Attitudes, and Pro-environmental Behaviours in Green and Non-Green Schools

Item		Environmental Knowledge	Pro-environmental Attitudes	Pro-environmental Behaviours
Environmental Knowledge	Pearson Correlation	1	-0.026	-0.245
	Sig. (2-tailed)		0.862	0.092
Pro-environmental Attitudes	Pearson Correlation		1	0.455**
	Sig. (2-tailed)			0.001
Pro-environmental Behaviours	Pearson Correlation			1
	Sig. (2-tailed)			

**. Correlation is significant at the 0.01 level (2-tailed).

To further investigate the correlation between these three abovementioned components in the different green and non-green schools, the Pearson correlation was conducted again to explore the relationship in the different four green and four non-green schools, respectively.

Table 5.11 reveals a low and insignificant correlation between teachers' environmental knowledge and pro-environmental attitudes toward green schools (r = 0.057, p > 0.05). In contrast, a negative and insignificant correlation between environmental knowledge and pro-environmental behaviours was obtained (r = -0.246, p > 0.05). Furthermore, the correlation between teachers' pro-environmental attitudes and pro-environmental behaviours was found to be moderate and significant (r = 0.559, p < 0.05).

Table 5.11

The Pearson Linear Correlation between Teachers' Environmental Knowledge, Pro-environmental Attitudes, and Pro-environmental Behaviours in Different Green Schools

Item		Environmental Knowledge	Pro-environmental Attitudes	Pro-environmental Behaviours
Environmental Knowledge	Pearson Correlation	1	0.057	-0.316
	Sig. (2-tailed)		0.791	0.133
Pro-environmental Attitudes	Pearson Correlation		1	0.559**
	Sig. (2-tailed)			0.005
Pro-environmental Behaviours	Pearson Correlation			1
	Sig. (2-tailed)			

**. Correlation is significant at the 0.01 level (2-tailed).

Table 5.12 reveals a small and insignificant correlation between N = 24 teachers' environmental knowledge and pro-environmental attitudes (r = 0.059, p > 0.05), or pro-environmental attitudes and pro-environmental behaviours (r = 0.249, p > 0.05) from non-green schools. However, the correlation between environmental knowledge and pro-environmental behaviours was found to be negative and insignificant (r = -0.127, p > 0.05).

Table 5.12

The Pearson Linear Correlation between Teachers' Environmental Knowledge, Pro-environmental Attitudes, and Pro-environmental Behaviours in Different Non-Green Schools

Item		Environmental Knowledge	Pro-environmental Attitudes	Pro-environmental Behaviours
Environmental Knowledge	Pearson Correlation	1	0.095	-0.127
	Sig. (2-tailed)		0.659	0.556
Pro-environmental Attitudes	Pearson Correlation		1	0.249
	Sig. (2-tailed)			0.241
Pro-environmental Behaviours	Pearson Correlation			1
	Sig. (2-tailed)			

**. Correlation is significant at the 0.01 level (2-tailed).

The results demonstrate a negative and insignificant linear correlation between teachers' environmental knowledge and pro-environmental attitudes (r = -0.026, p > 0.05) or environmental knowledge and pro-environmental behaviours (r = -0.246, p > 0.05); and the correlation between pro-environmental attitudes and pro-environmental behaviours (r = 0.455, p < 0.05) was moderate and significant. In detail, a low correlation between N = 24 teachers' environmental knowledge and pro-environmental attitudes (r = 0.057, p > 0.05), even negative relationship between environmental knowledge and pro-environmental behaviours (r = -0.246, p > 0.05), but the correlation between pro-environmental attitudes and pro-environmental behaviours (r = 0.559, p < 0.05) was positive and significant from green schools that could be observed. In contrast, an insignificant correlation between N = 24 teachers' environmental knowledge and pro-environmental attitudes (r = 0.059, p > 0.05), environmental knowledge and pro-environmental behaviours (r = -0.127, p > 0.05), or pro-environmental attitudes and pro-environmental behaviours (r = 0.249, p > 0.05) in non-green schools was discovered.

The findings are in line with previous studies that the correlation between teachers' environmental knowledge and environmental behaviours was weak and no obvious liner relationship (Kuhlemeier et al., 1999; Myers et al., 2004); the correlation between environmental knowledge and environmental behaviours was very low or negligible; and the

correlation between environmental knowledge, environmental attitudes, and between environmental behaviours was too weak (Liu et al., 2015). This result can also support Pe'er et al. (2007) who suggested that low environmental knowledge can affect teachers to forget to do some environmental behaviours to protect the environment. However, this result contrasts with Esa (2010) who proposed that a high correlation between environmental knowledge and attitude suggests that good environmental knowledge contributes to positive environmental attitudes. Furthermore, this result cannot support the EE knowledge-attitude-behaviour model. The linear model of knowledge-attitude-behaviour in EE has prevailed for many decades, although this model has attained intensive criticism (Hungerford & Volk, 1990; Jensen & Schnack, 1997; Kollmuss & Agyeman, 2002). The inherent and traditional EE model promotes environmental knowledge and can change attitudes and behaviours. However, this result is more similar to the goals of ESD. Although the basic concepts of ESD and EE are almost the same, ESD is more concerned with developing skills to solve environmental problems and access to knowledge and more concerned with developing people's environmental awareness and motivation to cultivate responsible environmental behaviour (UNESCO, 2019).

It is worth mentioning that the results of interviews with teachers in green schools and non-green schools showed that G1, G2, G3 and, NG1, NG2, NG3 all agreed that environmental knowledge has some effects on their environmental attitudes and environmental behaviours. Only NG4 took a negative attitude, and G4 took the opposite attitude. The present study analysed and discussed the explanation of the results. Firstly, the questionnaire survey conducted in the study included objective questions to measure teachers' environmental knowledge, attitudes toward protecting the environment, and behaviours toward protecting the environment, and the final results were objective. Meanwhile, because green schools provide teachers with many opportunities for training and environmental education, teachers in green schools were found to be more positive in the questionnaire survey. However, teachers in non-

green schools lacked environmental education. Therefore, their performance was relatively negative and, thus, the questions of the interview research were basically semi-structured questions designed for each teacher's situation and educational background, so the teachers' answers were more subjective, and they were also more positive during the interviews. Secondly, the present study puts forward that the results may be related to the inherent EE knowledge-attitude-behaviour model, which has always advocated that environmental knowledge affects attitudes and determines behaviours in traditional teaching concepts, and the inherent model has been widely studied. Therefore, in the consciousness of many teachers, environmental knowledge can improve their pro-environmental attitudes, and a better environmental attitude determines that they will have more behaviours related to environmental protection. As previously mentioned, in the previous study by Liu et al. (2015), the *EE knowledge-attitude-behaviour* model argues that knowledge is necessary for influencing behavioural change, and individuals can acquire knowledge and skills through learning. Most of the interviewees believed that there is a correlation between environmental knowledge, environmental attitudes, and environmental behaviours may also be because the relevant environmental training they have acquired is all based on traditional environmental education. In contrast, they do not have an in-depth understanding of Education for Sustainable Development (ESD). The green school project in Zhengzhou City is based on environmental education; it can provide teachers and students with environmental education training and activities. The purpose of environmental education is mainly to focus on cultivating environmental knowledge, attitudes, emotions, and skills of environmental educators, aiming to change attitudes and behaviours through knowledge (Saul, 2000). Nevertheless, ESD no longer focuses on environmental knowledge but on developing educated people's environmental skills and actions (Venkataraman, 2009). Although the concepts of EE and ESD are similar, many scholars advocate that EE should gradually convert to ESD (Ärlemalm-

Hagsér & Sandberg, 2011; Eilam & Trop, 2010). It can be indicated that developing the green school projects in Zhengzhou City, even in mainland China, can focus on the progress of EE in schools and gradually deepen the concept of ESD in the field of the green school project. Finally, the current study emphasised that some environmental knowledge issues involve a wide range of aspects. However, these environmental issues are not necessarily closely related to the lives of teachers, and most of the environmental knowledge they can learn is accessible daily. Even teachers in green schools may not be able to learn all about the environment from environmental education training. Therefore, they will behave to protect the environment based on the environmental issues they have come into contact with and learned. For example, G1 and G4 both talked about the activities of protecting the Yellow River, so the environmental protection behaviour of saving water exists in their knowledge reserves, and they will naturally do such things. However, the questions in the objective environmental knowledge questionnaire covered a broader range of knowledge, and they may not be able to feel the same. It does not prevent teachers from doing simple environmental protection behaviours such as energy conservation, emission reduction, and water conservation. On the contrary, the interview research results were more in line with the requirements of the current ESD.

Furthermore, G4 and NG4 indicated that they feel environmental knowledge could not affect their environmental attitudes and behaviours. This research analysis shows that although G4 and NG4 are teachers of different green and non-green schools, they both show no interest in environmental education and environmental protection activities and have an attitude that seems irrelevant to them. Their environmental attitudes and environmental behaviours are relatively low. NG4's educational background and the subjects she taught did not allow her to obtain environmental education and related training and, thus, she lacked professionalism in environmental knowledge, which also led her to feel that environmental issues were not related to her. However, NG4 also mentioned that knowing more might affect her behaviours, proving

that in her inherent consciousness, the EE knowledge-attitude-behaviour model still exists. Even though G4 is a teacher in the green school, she is dissatisfied with the selection criteria of the green school. She believes that many measures are not in line with her wishes but are required to be enforced, so G4 has shown a very negative attitude. However, precisely because of this, it also shows that the selection system of green schools in Zhengzhou City still needs to be improved for achieving the purpose of sustainable development.

In fact, the present study is the first to propose a study on teachers' environmental knowledge, attitudes, and environmental behaviours in green schools in mainland China. The present study still has certain limitations, but it also provides a reference for future research. First, teachers from green and non-green schools in the research survey were limited by COVID-19. Second, this study just compared teachers' environmental knowledge, attitudes, and behaviours in different level green schools and different non-green schools but previous scholars have also considered gender, age, and parents' educational backgrounds as factors (Dillon & Gayford, 1997; Gambro & Switzky, 1999; Kahyaoğlu, 2011; Kuhlemeier et al., 1999; Ma & Bateson, 1999; Tuncer et al., 2009). Therefore, future research should explore other influencing factors about teachers' environmental knowledge, attitudes, and behaviours regarding environmental literacy in green schools. Finally, the research site of this study was a city on the central plains of mainland China, but different cities may lead to differences in the level of educational background or the selection criteria for green schools, therefore, the results of the research will vary accordingly. Thus, the present study can provide a particular reference and help future research on green schools in mainland China.

5.7 Conclusion

This present study has demonstrated that teachers from green primary schools have significantly better performance ($p < 0.001$) on environmental knowledge, pro-environmental attitudes, and pro-environmental behaviours regarding environmental literacy than teachers from non-green primary schools in Zhengzhou City. However, no significant difference on teachers' performance ($p > 0.05$) between different level green schools could be obtained. Furthermore, the research results cannot support the EE knowledge-attitude-behaviour model; a negative and insignificant linear correlation between environmental knowledge and pro-environmental attitudes ($p > 0.05$), environmental knowledge, and pro-environmental behaviours ($p > 0.05$) among $N = 48$ teachers from green and non-green schools was obtained. In contrast, the correlation between pro-environmental attitudes and pro-environmental behaviours ($r = 0.455$, $p < 0.01$) was positive and significant. It is worth mentioning that the interview results illustrate that almost every interviewee argued that gaining environmental knowledge can affect individuals' attitudes toward protecting the environment and, thus, improve their behaviour towards protecting the environment. The interview results are consistent with the *EE model*. Based on the selection criteria and policies of the green school project in Zhengzhou City of Henan Province, environmental education training is allowed to be provided to teachers in green schools as an opportunity to learn environmental knowledge even for teachers without any relevant environmental background, and by examining teachers' environmental literacy regularly, teachers are more familiar with these three abovementioned components. On the contrary, in addition to the relevant requirements for teachers of science courses, teachers in non-green schools have almost no substantial interest in environmental education, and they have little knowledge of environmental issues. Therefore, teachers from non-green schools performed worse on environmental knowledge, pro-environmental attitudes, and pro-environmental behaviours regarding environmental literacy.

In conclusion, more primary schools in Zhengzhou City should actively select green schools because green schools can promote the sustainable development of the environment and primary school education. Green schools and education universities should be encouraged to incorporate EE, even ESD strategies and pedagogies, into pre-service teacher training curricula and professional development programmes. Although teachers' environmental knowledge, attitudes, and behaviours will improve, it is also essential to observe how students' EE learning benefits from teaching. Furthermore, the green school project in Zhengzhou City should gradually transform EE into ESD or integrate ESD into developing green school projects. In addition, the present study agrees and suggests that green schools regularly provide an examination of environmental literacy for students and teachers in both green and non-green schools.

Chapter 6

Conclusion and Practical Implication

6.1 Conclusion

The first part of the students' perceptions on the impact of vegetation on reducing psychological pressure, improving studying awareness, and environmental awareness investigated the implementation of green schools' selection criteria for vegetation coverage in Zhengzhou City. A comparative study of 5^{th} and 6^{th} Grade primary schools students revealed that students in green schools exhibited a more positive perception of the impact of vegetation on the abovementioned three sections. The research findings may be related to the selection criteria for green schools in Zhengzhou City. According to the criteria, the vegetation coverage on the campus should be no less than 37%. As a result, students in green schools can be more exposed to the green environment, and thus, students in green schools are better aware of the green vegetation. The first part of the present study also found a significant positive and strong linear correlation between students' perceptions of the impact of vegetation on reducing psychological pressure and improving studying awareness ($r = 0.878$, $p < 0.001$), reducing psychological pressure and improving environmental awareness ($r = 0.900$, $p < 0.001$), improving studying awareness and environmental awareness ($r = 0.899$, $p < 0.001$) among $N = 643$ students in green schools and non-green schools. However, the effects of school types (green school vs. non-green school) on students' perceptions caused by the vegetation impact were not observed ($p < 0.05$). Results indicate that green schools' selection criteria for vegetation coverage effectively affect students' perceptions of green vegetation's impact.

The second part of the present study was a comparative study of the environmental knowledge, pro-environmental attitudes, and pro-environmental behaviours regarding environmental literacy among 5th and 6th Grade students from green and non-green primary schools. The results demonstrated that students in green schools significantly outperformed students in non-green schools on all three abovementioned components ($p < 0.001$). Meanwhile, different school types affect students' environmental knowledge, environmental attitudes, and environmental behaviours. In detail, students in provincial-level green schools significantly outperformed students in municipal-level green schools in their environmental knowledge and pro-environmental attitudes. However, there was no significant difference found in students' pro-environmental behaviours between provincial-level and municipal-level green schools. Among the non-green schools studied, students from the school (School D) preparing to participate into the green school project and be selected as the *'municipal-level green school'* significantly outperformed other students in the other three non-green schools. Furthermore, the second part of the current study discovered a weak but significant linear correlation between $N = 485$ students' environmental knowledge and pro-environmental attitudes ($r = 0.163$, $p < 0.001$), pro-environmental attitudes and pro-environmental behaviours ($r = 0.184$, $p < 0.001$) in green and non-green schools, but the correlation between students' environmental knowledge and pro-environmental behaviours ($r = 0.072$, $p < 0.001$) was small and insignificant. Results illustrate that the implementation of the green school project to be conducive for students in Zhengzhou City. Students from green schools were found to be more positive in environmental knowledge, pro-environmental attitudes, and pro-environmental behaviours regarding environmental literacy than non-green schools.

The third part of the present study was a comparative research of the three components of environmental literacy, namely, environmental knowledge, pro-environmental attitudes, and pro-environmental behaviours among teachers from green and non-green primary schools. The

current results exposed those teachers from green schools significantly outperformed ($p < 0.001$) teachers from non-green schools on the three components regarding environmental literacy, the green school project was found to be conducive to these three abovementioned components regarding the environmental literacy of teachers in Zhengzhou City. Furthermore, the third part of this paper obtained the linear correlation between $N = 48$ teachers' environmental knowledge and pro-environmental attitudes ($r = -0.026$, $p > 0.05$) or environmental knowledge and pro-environmental behaviours ($r = -0.246$, $p > 0.05$) was negative and insignificant in green and non-green schools. This correlation result did not support the *EE model* regarding *EE knowledge-attitudes-behaviours*. Interestingly, the interview results were in contrast. Many teachers believed that a significant positive correlation exists between environmental knowledge, attitudes, and behaviours. They argued that gaining environmental knowledge can affect individuals' environmental attitudes and, thus, improve their environmental behaviour. This result is consistent with the *EE model*. Based on the selection criteria of green school projects in Zhengzhou City, teachers in green schools are provided with adequate environmental education training and some environmental activities. Therefore, under the requirements of green schools, even if the in-service teachers have not been exposed to environmental education in their previous education and teaching background, they can still learn more about environmental knowledge through the relevant environmental education training, which can be acquired from their serving green schools. In contrast, non-green schools do not require relevant environmental education for in-service teachers, except for teachers from relevant science subjects. Therefore, teachers in green schools who were exposed to environmental education programmes, performed better in environmental knowledge, attitudes, and behaviours.

6.2 Practical Implications

6.2.1 The Importance of Vegetation in Green Schools

The present study result provides implications and references for the future progress of the green school project in mainland China, especially in Zhengzhou City of Henan Province. First, it affirms the selection criteria of vegetation coverage in the Zhengzhou Green School Project from the present research results. Therefore, it believes that the requirements of the green school project in Zhengzhou City for vegetation coverage can effectively and positively affect students, especially in reducing psychological pressure and improving studying and environmental awareness. Although some interviewees in this survey disagreed with this standard of vegetation coverage, believing that such a standard may lead to a waste of resources. However, this research suggests that the rational planning of constructing green landscapes in green schools can effectively avoid the waste of resources. It also suggests that many schools in Zhengzhou City may not meet the green school's standard of vegetation coverage without enough school area. Therefore, the green school project should consider the actual area of each school and reduce the standard of vegetation coverage rationally so that more schools could have the opportunity to participate into the green school project and ensure the vegetation coverage area in each school. Meanwhile, other cities in mainland China can also consider the coverage area of vegetation in the construction of the green school project according to the actual geographical situation of the school (Huang & Lee, 2020, p. 125). After all, both Shenzhen Overseas Chinese Town Primary School and Xinjiang Urumqi Primary School have given full play to their geographical advantages and made significant improvements to the greening of their campuses in combination with the actual situation (Huang & Lee, 2020, p. 125). Therefore, the present study encourages the development of green schools in Zhengzhou

City and even mainland China, and advocates that schools should consider vegetation as a critical component while constructing campus landscapes.

6.2.2 The Implementation of Environmental Education (EE)

The importance of developing green schools in Zhengzhou City based on environmental education through the present study results can be affirmed. As some research proposed before, environmental education plays a vital role in primary education. Nevertheless, only green schools in Zhengzhou City currently require environmental education training for students and teachers. However, green primary schools in Zhengzhou City account for only 10% of all schools, and the number of green primary schools is still minimal. The critical impact of environmental education on primary education suggests that the green school project in Zhengzhou City and even mainland China can be implemented in primary schools and encourage more primary schools to participate in the green school project. This research also suggests that the green school project can integrate environmental education into interdisciplinary evolution in the background of environmental education. Furthermore, non-green schools, especially primary schools, can also provide more training and activities on environmental education for teachers and students and cultivate teachers' and students' interest in the environment.

As teachers are prominent in environmental education, pre-service teachers should be provided with environmental education (EE) training. Teachers are responsible for completing all environmental education that can follow regulations (Ergin, 2019). Teachers play an essential role in determining the quality of primary environmental education. Thus, the quality of primary environmental education depends on teachers' awareness of environmental issues, conservation, and education (Than, 2001). Any effective EE programme for teachers is likely to be more than just a type of training but an opportunity for specialized progress that enables

them to develop this drive and commitment (Ernst, 2009), and equip teachers with knowledge about environmental issues and practical strategies for teaching EE. Therefore, the current study suggests that pre-service teachers should obtain a certain level of environmental education; whether they teach in green schools or not, it will be beneficial for them to actively integrate environmental education content in the classroom. It will also enable future environmental education to carry out across disciplines.

In addition, this research agrees and suggests that green schools regularly examine environmental literacy for students and teachers in green schools. Especially, examining their environmental knowledge as environmental knowledge is often considered the fundamental component of environmental literacy (Liu et al., 2015). Environmental literacy is not only a development policy of Zhengzhou City's green schools based on environmental education construction (Zhengzhou Education Bureau, 2020) but also a tool for testing environmental education (NAAEE, 2004). Therefore, green schools in Zhengzhou City and even mainland China can integrate the examination of students' and teachers' environmental literacy into the selection criteria that should be considered. Meanwhile, non-green schools can also consider integrating the examination of environmental literacy into teachers' training. Teachers' environmental literacy can affect students. A teacher's environmental attitude can directly affect the students' discipline (Özden, 2008). When teachers are with adequate understanding of the environment, students' environmental literacy will be improved (Turner et al., 2009). If teachers have environmental knowledge, have positive environmental attitudes, and care about environmental issues, they will produce environmentally literate students (Esa, 2010).

6.2.3 Environmental Education (EE) to Education for Sustainable Development (ESD)

According to the research results on teachers in the third part, it was found that the traditional EE model to be not fully applicable to the training of teachers. However, the importance of EE

in the development of green schools can be affirmed; an attempt can gradually convert the traditional EE to the ESD in the future development of green schools. Even if the concepts of EE and ESD are similar, traditional EE focuses on acquiring environmental knowledge and hopes to change environmental attitudes through environmental knowledge, and environmental attitudes determine environmental behaviours. Regarding environmental education for citizens in European Eco-Schools, EE aims to develop environmentally responsible citizens who are environmentally responsible, can solve environmental problems, and understand sustainable development (Dobson, 2007; Huckle, 2001). Environmental education also contains aims, tools, and programmes to develop and support environment-related attitudes, values, awareness, knowledge, and skills that enable people to behave sensibly about the environment (Monroe & Krasny, 2015). In comparison, the goals of ESD further strengthen the development of citizens' behavioural capabilities and motivations. ESD emphasises the development of human behavioural capabilities and skills, not just limited to knowledge acquisition and cultivation (UNESCO, 2015). ESD development focuses on developing the values and skills of people to participate in deciding things and issues globally and locally, individually, and collectively, that will enhance the quality of life now without harming the planet in the future (Summer et al., 2005). Based on the development goals and concepts of ESD, the development of the green school project in Zhengzhou City in the future can also integrate the development goals of ESD into the project. As a result, the green school project can focus on training students' environmental actionability and pay more attention to cultivating students' awareness of environmental protection and the ability to solve environmental issues.

6.3 Limitation and Future Works

The present study is the first to propose a study on students' perceptions of vegetation impact and students' and teachers' environmental knowledge, attitudes, and behaviours in green schools in mainland China. However, the present study still has certain limitations and provides

a reference for future research. First, students and teachers from green and non-green schools in the research survey were limited by COVID-19. Second, this study just compared students' and teachers' environmental knowledge, attitudes, and behaviours in different level green schools and different non-green schools, but previous scholars have also considered gender, age, and parents' educational backgrounds as factors (Dillon & Gayford, 1997; Gambro & Switzky, 1999; Kahyaoğlu, 2011; Kuhlemeier et al., 1999; Ma & Bateson, 1999; Tuncer et al., 2009). Therefore, future research should explore other influencing factors about students' and teachers' environmental knowledge, attitudes, and behaviours regarding environmental literacy in green schools. Finally, the research site of this study was a city on the central plains of mainland China, but different cities may lead to differences in educational background or the selection criteria for green schools. Therefore, the results of the research will vary accordingly. Thus, the present study can provide a particular reference and help future research on green schools in mainland China. Furthermore, the next stage of the research aims at examining students' and teachers' age and gender as influence factors on their environmental literacy in green schools, and also plans to make a comparative study about the green school project in different regions in mainland China.

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Appendix 1

The Questionnaire of Students' Perceptions of the Impact of Vegetation for Chapter 3 (Part 1)

English Edition

The Impact of Vegetation (Please select ONE answer that best represents your view and tick √ the corresponding box.)

Question **For example: I think more vegetation should be planted.** **Answer: I "very agree" with this statement, tick √ below (1).**	**Strongly Disagree (1)**	**Disagree (2)**	**Neutral (3)**	**Agree (4)**	**Strongly Agree (5)**
Section A: Psychological Pressure					
1. I think vegetation can relax me.					
2. I think vegetation reduces stress on my body.					
3. I think vegetation can effectively relieve my visual fatigue.					
4. Every student can relieve their physical and mental pressure when they study in a school covered with green vegetation.					
Section B：Studying Awareness					
5. I think I can improve my classroom performance when studying on a green campus					
6. My academic performance can be improved when I study in a school covered with green vegetation.					
7. Vegetation can help me learn more about the environment.					
8. I think I know the importance of green vegetation.					
Section C: Environmental Awareness					
9. When I study in a space surrounded by lots of greenery, it makes me want to learn about the environment.					
10. I think there is a link between the vegetation and environmental protection.					

11. I think I know what environmental sustainability is.					
12. I believe that vegetation promotes environmental sustainability.					
13. I don't think it's my business to protect green vegetation.					
14. I think all schools need more greenery.					
15. I think vegetation can make our campus a beautiful landscape.					
16. I think everyone needs to understand the definition of vegetation and the environment.					

Chinese Edition

關於綠色植被對學生的影響的調查

親愛的同學:

你好！想了解一下你對綠色植被帶給你的感受是什麼，希望你能認真完成這份問卷。請根據自己的實際情況作答，謝謝你的支持和幫助。

學校: 綠色學校/非綠色學校

所在班級:

學號/編號:

綠色植被的影響 (請√適當選項)

問題 例如：我認為應該多種植綠色植被。 答：我"非常同意"这个说法，在（1）下面打√。	**非常不同意 (1)**	**不同意 (2)**	**中立 (3)**	**同意 (4)**	**非常同意 (5)**
A 部分：綠色植被對身心壓力的影響					
1.我認為綠色植被可以使我放鬆。					
2.我認為綠色植被可以減輕我的身體壓力。					
3.我認為綠色植被可以有效緩解我的視覺疲勞。					
4.我認為每個學生在綠色植被覆蓋的學校學習時都可以減輕他們的身心壓力。					
B 部分：綠色植被對學習意識的影響					
5.認為當我在一個綠色植被覆蓋的校園裡學習時，我可以提高我的課堂表現力。					
6.我認為當我在綠色植被覆蓋的學校裡學習時，可以提高我的學習成績。					
7.我認為綠色植被可以幫助我了解更多的環境知識。					
8.我想我知道綠色植被的重要性。					

C 部分：綠色植被對環境意識的影響					
9.我認為當我在大量綠色植被環繞的空間學習時，可以讓我想要去了解環境。					
10.我認為綠色植被與環境保護之間存在一種聯繫。					
11. 我想我知道什麼是環境可持續發展。					
12.我認為綠色植被可以推動環境可持續發展。					
13.我認為保護綠色植被這件事與我無關。					
14. 我認為所有學校都需要種更多的綠色植被。					
15. 我認為綠色植被可以使我們的校園成為一個美好的景觀。					
16.我認為每個人都需要了解綠色植被以及環境的定義。					

Appendix 2

The Questionnaire of Students' Environmental Knowledge, Pro-environmental attitudes, and Pro-environmental behaviours for Chapter 4 (Part 2)

English Edition

1. **Students' Environmental Knowledge (Please select ONE answer that best represents your view and tick √ the corresponding box.)**

Question **1.Ozone Layer**	**Yes** **(1)**	**No** **(2)**	**Don't Know** **(3)**
1. I know what the ozone layer is.			
2. The ozone layer keeps the world warm.			
3. The hole in the ozone layer is getting worse because of human activity.			
4. If the holes in the ozone layer get worse, there will be more flooding in the world.			
5. If the holes in the ozone layer get worse, air will escape from the atmosphere into space.			

Question **2. Greenhouse Effect and Global Warming**	**Yes** **(1)**	**No** **(2)**	**Don't Know** **(3)**
6. Overall, the Earth has not become warmer during the past 100 years.			
7. Greenhouse effect is caused by solar radiation passing through holes in the ozone layer and warming the Earth.			
8. Human activities cause current global warming.			
9. CO_2 is the most powerful greenhouse gas.			
10. Large-scale planting of trees can effectively absorb greenhouse gases.			

Question **3. Air Pollution**	**Yes (1)**	**No (2)**	**Don't Know (3)**
11. Each year in the world there are millions of premature deaths due to air pollution.			
12. Air pollution has become one of the most serious environmental problems globally.			
13. Most air pollution is caused by harmful gases emitted by factories burning fossil fuels.			
14. Vehicle exhaust emission, especially carbon dioxide emission, is one of the important air pollution factors.			
15. In mainland China, the Air Pollution Index can reflect the air pollution level.			

Question **4.Environmental Information**	**Yes (1)**	**No (2)**	**Don't Know (3)**
16. Trees can help support the water cycle in the atmosphere.			
17. Trees play a vital role in absorbing greenhouse gases.			
18. Water resources are important resources for human survival.			
19. Freshwater is an essential natural resource for all ecosystems.			
20. Freshwater does not create a toxic environment for aquatic life.			

2. Students' Environmental Attitude (Please select ONE answer that best represents your view and tick √ the corresponding box.)

Question **For example: I think environmental protection has nothing to do with me.** **Answer: I " strongly disagree with" this statement, tick √ below (1).**	**Strongly Disagree (1)**	**Disagree (2)**	**Neutral (3)**	**Agree (4)**	**Strongly Agree (4)**
1. I don't think my actions affect our environment.					
2. I need to meet my own life needs before considering whether to protect our environment.					
3. If others don't protect the environment, then it's not worth it for me to protect the environment.					
4. Green travel and a green lifestyle can effectively solve our air pollution problem. (Green lifestyle means green travel reduces carbon emissions, etc.)					
5. I can make noise at will in my home.					
6. The environmental problem is not my problem, and it should belong to the government management.					
7. I will often use plastic bags because plastic bags are very convenient; I don't think plastic bags will pollute the environment.					
8. I often litter the trash. If there is a trash can, I will choose to throw the trash into the trash can.					
9. I understand and know some environmental protection laws issued by the government.					
10. Environmental behaviour is a very abstract concept that I don't understand and don't know what to do.					
11. Waste management is not what our environment currently requires.					
12. I think I'm free to waste food wherever I am.					
13. I will use water according to my personal needs, no matter how much.					
14. Whether water is wasted or not is my matter.					
15. The problem of environmental pollution is out of control, so there is nothing we can do now, we can do nothing.					

3. Students' Environmental Behaviours (Please select ONE answer that best represents your view and tick √ the corresponding box.)

Question	**Yes (1)**	**No (2)**
1. Do you like sunrises and sunsets?		
2. Do you water the flowers every day?		
3. Do you turn off lights or other power sources when you leave the room?		
4. When your phone or other electronic device is fully charged, will you unplug it?		
5. After completing online learning, do you automatically turn off your tablet or computer?		
6. Do you turn off the tap to prevent water waste when washing your hands?		
7. Do you stop your family and friends from wasting water?		
8. Is the water you can't finish going to waste?		
9. Do you turn on the faucet when you brush your teeth?		
10. Do you often travel by public transport?		
11. Do you regularly use electric vehicles, bicycles, and walking to reduce carbon emissions?		
12. Do you use trash cans everywhere instead of littering?		
13. Do you often participate in environmental protection activities held in schools or other places?		
14. If your community and school hold environmental protection activities, would you take the initiative to participate?		
15. Do you know the impact of water pollution and air pollution on our daily lives?		

Chinese Edition

關於學生環境知識，環境態度以及環境行為的問卷調查

親愛的同學

你好！想了解一下你對環境方面的了解程度，希望你能非常認真地完成這份問卷。請根據自己的實際了解情況作答，非常感謝。

學校：綠色學校/非綠色學校（請選擇）

所在班級：

姓名/學號：

1. 學生環境知識問卷 （請在適當的選項上劃 "√"）

問題 **1.臭氧層**	**是** **(1)**	**否** **(2)**	**不知道** **(3)**
1.我知道什麼是臭氧層。			
2.臭氧層的存在使世界保持溫暖。			
3.臭氧層空洞變得惡化是人類活動造成的。			
4.如果臭氧層空洞變得越來越嚴重，地球上將出現很多的洪水。			
5.如果臭氧層空洞變得越來越嚴重，空氣將從我們的大氣層消失。			

問題 **2. 溫室效應與全球變暖**	**是** **(1)**	**否** **(2)**	**不知道** **(3)**
6.总体来说，在过去的一百年里，我们的地球没有变暖。			
7. 温室效应是由于太阳辐射穿过臭氧层空洞而使地球变暖的。			
8. 现在的全球变暖是由人类活动造成的。			
9.二氧化碳是目前地球上存在的最主要的温室气体。			
10.大量种植树木可以有效地吸收温室气体。			

問題 3.空氣污染	是 (1)	否 (2)	不知道 (3)
11. 世界上每年都有數百萬人因為空氣污染而死亡。			
12. 空氣污染已經成為了世界上最嚴重的環境問題之一。			
13.大部分的空氣污染都是由於工廠燃燒礦物燃料所排放的有害氣體造成的。			
14. 車輛尾氣的排放，尤其是二氧化碳的排放是污染空氣的重要因素之一。			
15. 在中國大陸，空氣污染指數可以反應一個地區的空氣污染水平。			

問題 4.自然環境知識	是 (1)	否 (2)	不知道 (3)
16. 樹木可以幫助支持大氣中的水循環。			
17.樹木在吸收溫室氣體上起到了至關重要的作用。			
18. 水資源是人類賴以生存的重要資源。			
19. 淡水是所有生態系統所必須的重要自然資源。			
20. 淡水不會對水生生物造成有毒環境。			

2. 學生環境意識問卷(請√適當選項)

問題 例如：我認為環境保護與我無關。 答：我"非常不同意"這個說法，在（1）下面打√。	**非常不同意 (1)**	**不同意 (2)**	**中立 (3)**	**同意 (4)**	**非常同意 (5)**
1.我認為我自己的行為不會影響到我們的環境。					
2.我需要先滿足我自己的生活需求，然後再考慮是否要保護我們的環境。					
3.如果別人不去保護環境，那麼我去做保護環境的事情也是不值得的。					
4.綠色出行以及綠色的生活方式能夠有效解決我們的空氣污染問題。（綠色生活方式是指，綠色出行減少碳排放量等）					
5.我在我的家中可以隨意製造噪音.					
6.環境問題不是我的問題，它應該屬於政府管理。					
7.我會經常的使用塑料袋，因為塑料袋非常的方便，我不認為塑料袋會污染環境。					
8.我經常會隨手亂丟垃圾，如果有垃圾桶，我才會選擇將垃圾丟進垃圾桶。					
9.我了解並知道一些政府出台的環境保護法。					
10.環境行為是一個非常抽象的概念，我不能理解，也不知道該怎麼做。					
11.廢物管理並不是當前我們環境所需要的。					
12.無論我身在何處，我認為我都可以隨意的浪費食物。					
13.我會根據我的個人需求來使用水資源，無論多少。					
14.是否浪費水資源是我個人的事情。					
15.環境污染問題已無法控制，所以我們現在無能為力，可以什麼都不用做。					

3. 學生環境行為問卷(請√適當選項)

問題	是 (1)	否 (2)
1.您喜歡日出和日落嗎?		
2.您每天都會澆花嗎?		
3.您離開房間時會隨手關燈或者其他電源嗎?		
4.手機或其他電子設備充滿電後，您會主動拔掉電源嗎?		
5.完成線上學習後，您是否會主動關閉平板電腦或者電腦呢?		
6.洗手時您會關閉水龍頭防止水資源浪費嗎?		
7.您是否會阻止家人以及朋友浪費水資源?		
8.您喝不完的水是否會浪費掉?		
9.您在刷牙的時候會開著水龍頭嗎?		
10.您是否會經常選擇公共交通工具出行?		
11.您是否會經常使用電動車，自行車以及步行來減少碳排放量?		
12.您是否会在每个地方都使用垃圾桶而不是随手乱丢垃圾?		
13.您會經常參加學校或者其他地方舉辦的環境保護活動嗎?		
14.如果您所在的社區和學校舉辦環境保護活動，您會主動選擇參加嗎?		
15.您知道水污染，空氣污染對我們日常生活的影響嗎?		

Appendix 3

The Questionnaire for Teachers' Environmental Knowledge, Pro-environmental Attitudes, and Pro-environmental Behaviours for Chapter 5 (Part 3)

English Edition

1. **Teachers' Environmental Knowledge (Please select ONE answer that best represents your view and tick √ the corresponding box.)**

Question **1.Ozone Layer**	**Yes** **(1)**	**No** **(2)**	**Don't know** **(3)**
1. The ozone layer protects the earth from ultraviolet (UV) rays from the sun.			
2. The ozone layer keeps the world warm.			
3. Holes in the ozone layer are worsening by gases called chlorofluorocarbons (CFCs) which have been widely used as refrigerants.			
4. If the holes in the ozone layer get worse, more people will get skin cancer.			
5. If the holes in the ozone layer get worse, there will be more flooding in the world.			
6. If the holes in the ozone layer get worse, air will escape from the atmosphere into space.			

Question **4. 2. Greenhouse effect and global warming**	**Yes** **(1)**	**No** **(2)**	**Don't know** **(3)**
7. Overall, the Earth has not become warmer during the past 100 years.			
8. Greenhouse effect is caused by solar radiation passing through holes in the ozone layer and warming the Earth.			
9. Greenhouse gases are responsible for keeping the Earth warm; without them, the planet would be frozen and lifeless.			
10. Man's burning of fossil fuels has increased the amount of carbon dioxide (Carbon Dioxide) in Earth's atmosphere.			
11. Carbon Dioxide (CO_2) is the most powerful greenhouse gas.			
12. It is certain that present global warming is caused by man's activities.			
13. Planting new forests can help to reduce the amount of CO_2 in the atmosphere.			

Question **3.Air Pollution**	**Yes** **(1)**	**No** **(2)**	**Don't Know** **(3)**
14. The roadside air quality monitoring stations operated by the Environmental Protection Department are to monitor the concentrations of major air pollutants at the surroundings and street level.			
15. As air quality monitoring stations are located on top of the buildings, the indices measured are generally higher.			
16. There are five air pollution levels in mainland China.			
17. Air pollution indices show the measurements of the average of all kinds of concentrations of air pollutants.			
18. Motor vehicles are the major sources of sulphur dioxide (SO_2).			
19. Emissions from power stations and motor vehicles are the two major sources of nitrogen oxides (NOx).			
20. Each year in the world there are millions of premature deaths due to air pollution.			

Question **5. 4.Solid Waste**	**Yes** **(1)**	**No** **(2)**	**Don't Know** **(3)**
21. At present there are no incineration facilities in mainland China.			
22. The solid waste disposed in mainland China last year was mainly domestic waste.			
23. Domestic waste, construction waste and commercial waste are municipal solid waste.			
24. Municipal solid waste collected in urban districts would be delivered directly to landfills.			
25. Landfill gas can be used as fuel for town gas production.			
26. Burning plastic waste would produce toxic gas dioxin which pollutes the air.			
27. Landfills are mainly used in the Chinese mainland for solid waste disposal.			

Question **6. 5. Environmental Information**	**Yes** **(1)**	**No** **(2)**	**Don't know** **(3)**
28. "Earth Hour" is a global event organised by World Wild Fund (WWF) for Nature.			
29. The United States refused to sign the Kyoto Protocol.			
30. The Kyoto Protocol has no legal bondage, it only encouraged countries to reduce the emissions of greenhouse gases.			

31. One of the targets of the Copenhagen Accord is to reduce the amount of greenhouse gases emissions			
32. The Copenhagen Accord has legal bondage; it limited the amount of carbon emissions of individual countries.			
33. Developed and developing countries held the same view on the issue of the reduction of carbon during the Copenhagen Summit.			

2. Teachers' Pro-environmental Attitude (Please select ONE answer that best represents your view and tick √ the corresponding box.)

Question	Strongly Disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)
1. Technology is the most useful solution to environmental problems.					
2. People should accept the inconveniences brought to our lives due to environmental protection.					
3. Environmental quality has to be sacrificed for economic development and life prosperity.					
4. We are approaching the limit of the number of people the Earth can support.					
5. Healthy economic development relies on the control of the stability of industrial growth.					
6. Environmental problems are not complicated and can easily be resolved.					
7. Humans are born to rule over the nature.					
8. Every environmental problem is unique and individual.					
9. To survive, mankind has to live harmoniously with the nature.					
10. Mankind does not have to adapt to the environment, for by reforming the nature, they can satisfy their needs.					
11. The balance of nature is very delicate and can easily be upset.					
12. Mankind's over-interference with the nature would often lead to disastrous consequences.					
13. The Earth is like a spaceship, with limited room and resources.					
14. Using technology to resolve an environmental problem would lead to another environmental problem.					
15. Environmental problems would become more and more serious, hence, their solutions would become more and more complicated and difficult.					
16. There are limits in growth in an industrial society.					

7. Teachers' Pro-environmental Behaviours (Please select ONE answer that best represents your view and tick √ the corresponding box.)

Question	Never (1)	Seldom (2)	Sometimes (3)	Often (4)	Always (5)
1. I would sort the cans out for recycling.					
2. I would send electronic cards rather than gifts.					
3.In summer, I would use electric fans rather than air conditioners					
4. I would not buy products that pollute the environment.					
5. I would donate furniture and clothing to charities.					
6. I would donate money to environmental organisations so that they can continue the work for environmental conservation.					
7. I would read articles and news and watch TV programmes on environmental issues.					
8. I would discuss environmental issues with my friends.					
9. I would ask for "less rice" if I know I am not able to finish the whole dish.					
10. I would write to the newspaper editor concerning environmental issues.					
11. I would participate in environmental protection activities such as "Earth Hour" and "No Air-conditioning Day" by turning off the lights and turning off the air-conditioners.					
12. I pay attention to the news about Copenhagen Accord and other international conferences related to environmental protection.					
13. I would involve myself actively in the environmental activities held in my community.					
14. Whether to support a local political party, its commitment to improve our environment or alleviate pollution problems is my major concern.					
15. I know where to go for complaining pollution problems.					
16. I prefer taking public transport than private cars.					
17. If I can drive, I would not idle my vehicle with running engines.					
18. I would express my views on environmental conservation on social networking websites (e.g., Facebook).					

19. I pay attention to the environmental policies implemented in Hong Kong, China and countries all over the world.					
20. I am a member of at least one local or international environmental association and would engage in promoting environmental protection regularly.					

Chinese Edition

關於教師環境知識，環境保护態度以及環境保护行為的問卷調查

親愛的老師:

您好！非常感謝您在百忙之中抽出時間參與本研究的問卷調查。我是香港教育大學的一名科學與可持續發展的博士在讀生，現在正在進行博士論文的研究工作，希望調查研究"教師的環境素養"。希望能夠向您了解相關情況，幫助我完成這份問卷。本次問卷調查為匿名填寫，僅用於學術研究，不涉及絕密信息，不作其他用途，請您放心作答。您的積極參與於配合對本研究非常重要，請根據您的實際情況作答，謝謝您的幫助。

學校:

訪問人:

職務:

1. 教師環境知識問卷 (請√適當選項)

問題 **1.臭氧層**	**是** **(1)**	**否** **(2)**	**不知道** **(3)**
1.臭氧層保護地球免受太陽紫外線（UV）的傷害。			
2. 2.臭氧層使世界變得溫暖。			
3.被廣泛用作製冷劑的稱為氯氟烴（CFC）的氣體使臭氧層中的空洞惡化。			
4. 如果臭氧層上的空洞變得更糟，更多的人會患上皮膚癌。			
5.如果臭氧層中的空洞變得更糟，世界上就會有更多的洪水氾濫。			
6. 如果臭氧層中的空洞變得更糟，空氣將從大氣中逸出進入太空。			

問題 **2.溫室效應與全球變暖**	**是** **(1)**	**否** **(2)**	**不知道** **(3)**
7.總體而言，地球在過去 100 年沒有變暖。			
8. 溫室效應是由於太陽輻射穿過臭氧層的空洞並使地球變暖而引起的。			

9. 溫室氣體負責保持地球溫暖； 沒有它們，地球將變得冰冷且無生命。			
10. 人類燃燒化石燃料增加了地球大氣層中的二氧化碳含量。			
11. 二氧化碳是最強大的溫室氣體。			
12. 可以肯定，目前的全球變暖是由人類的活動引起的。			
13. 植樹造林可以幫助減少大氣中的二氧化碳含量。			

問題 **3.空氣污染**	**是** **(1)**	**否** **(2)**	**不知道** **(3)**
14. 環境保護署營辦的路邊空氣質素監測站，須監察周圍及街道的主要空氣污染物濃度。			
15.由於空氣質量監測站位於建築物的頂部，因此測量的指標通常較高。			
16.目前大陸的空氣污染指數分為 5 級。			
17.空氣污染指數顯示了各種空氣污染物濃度平均值的測量值。			
18.機動車輛是大陸的主要二氧化硫來源。			
19.發電廠和機動車輛的排放是目前大陸很多城市氮氧化物的兩個主要來源。			
20.全世界每年都有數百萬人因空氣污染過早死亡。			

問題 **4.固體廢物**	**是** **(1)**	**否** **(2)**	**不知道** **(3)**
21.目前，中國大陸沒有焚化固體廢物的設施。			
22.去年在中國大陸處置的固體廢物主要是生活垃圾。			
23.生活垃圾，建築垃圾和商業垃圾為城市固體垃圾。			
24.在市區收集的城市固體廢物將直接運送至堆填區。			
25.垃圾填埋氣體可用作城鎮煤氣生產的燃料。			
26.燃燒塑料廢物會產生有毒氣體二噁英，污染空氣。			
27.垃圾填埋場主要在中國用於固體廢物處理。			

問題 **5.環境信息知識**	**是** **(1)**	**否** **(2)**	**不知道** **(3)**
28.“地球一小時” 是世界自然基金會（WWF）為自然組織的全球性活動。			
29.美國拒絕簽署《京都議定書》。			
30.《京都議定書》沒有法律約束力，僅鼓勵各國減少溫室氣體的排放。			
31.哥本哈根協議的目標之一是減少溫室氣體的排放量。			
32.哥本哈根協議具有法律約束力，它限制了各個國家的碳排放量。			
33.在哥本哈根峰會期間，發達國家和發展中國家在減少碳排放問題上持相同觀點。			

2.教師環境態度問卷 (請√適當選項)

問題	非常不同意 (1)	不同意 (2)	中立 (3)	同意 (4)	非常同意 (5)
1.技術是解決環境問題的最有用的解決方案。					
2.人們應該接受由於環境保護給我們的生活帶來的不便。					
3.為了經濟發展和繁榮，必須犧牲環境質量。					
4.我們正在接近地球可以支持的人數極限。					
5.健康的經濟發展取決於對工業增長穩定的控制。					
6.環境問題並不復雜，可以輕鬆解決。					
7.人類天生就是統治自然的人。					
8.每個環境問題都是獨立的個體。					
9.為了生存，人類必須與自然和諧相處。					
10.人類不必適應環境，因為通過改造自然，它們可以滿足其需求。					
11.自然的平衡非常微妙，很容易被破壞。					
12.人類對自然的過度干預往往會導致災難性的後果 。					
13.地球就像一艘太空船，空間和資源都是有限的。					
14.使用技術解決環境問題將導致另一個環境問題的出現。					
15.環境問題將變得越來越嚴重，因此解決問題的方法將變得越來越複雜和困難。					
16.工業社會的增長是有限度的。					

3.教師環境行為問卷 (請√適當選項)

問題	從不 (1)	偶爾 (2)	有時 (3)	經常 (4)	總是 (5)
1.我將罐子分類以便回收。					
2.我會發送電子賀卡來取代禮物。					
3.夏天天熱時，我會使用電風扇而不是空調。					
4.我不會購買會污染環境的產品。					
5.我會向慈善機構捐贈不用的家具和不穿的衣物。					
6.我會向環保組織捐款，以便他們繼續開展環境保護工作。					
7.我會閱讀文章和新聞，並觀看有關環境問題的電視節目。					
8.我會和朋友們討論環境問題。					
9.如果我覺得午飯或者晚飯我吃不完，我會要求“少飯”。					
10.我會將就環境問題寫信發給報刊編輯。					
11.我會關掉電燈並關閉空調，參加“地球一小時”和“無空調日”等環保活動。					
12.我關注有關哥本哈根協議和其他與環境保護有關的國際會議的新聞。					
13.我將積極參與社區或學校中舉辦的環保活動。					
14.我會支持一個地方組織，其對改善我們的環境或減輕污染問題的承諾。					
15.我知道去哪裡可以反映現在的環境問題。					
16.我更喜歡乘坐公共交通工具而不是私家車。					
17.如果我可以開車，我不會在發動機運轉的情況下空轉車輛。					
18.我會在社交網站（例如 Facebook）上表達我對環境保護的看法。					

19.我關注在香港，中國內地和世界各國實施的環境政策。					
20.我是至少一個地方或國際環境協會的成員，並將定期參加促進環境保護的活動。					

Appendix 4

Semi-structure Interview Guidelines for Teachers' Environmental Knowledge, Pro-environmental Attitudes, and Pro-environmental Behaviours for Chapter 5 (Part 3)

Common Questions for Teachers in Green Schools and Non-Green Schools	
Green School	**Non-Green School**
Background and Experience	
1. Which subject are you teaching? 請問您是哪一門學科的老師? 1.1 How many years have you been teaching? 教齡是幾年? 1.2 What is your academic background (Including disciplines and the highest education? 學歷背景是什麼呢（含學科和最高學歷）? 1.3 Have you taught any other subjects before? If so, what was the subject? How long have you been teaching? 請問您之前有教過其他科目嗎?如果有，什麼學科?教了多長時間? 1.4 When did you come to teach in the green school? (For asking teachers in green school). 請問您是什麼時候來綠色學校任教的呢?（針對綠色學校老師） 1.5 Are you the head teacher? 請問您是不是班主任老師嗎?	
2. Have you received any training related to environmental education or environmental knowledge? 請問您有接受過和環境教育或者環境知識相關的培訓嗎? 2.1 If yes, when was it accepted? 如果有，請問是什麼時候接受的呢? If yes, what is the form of the training? 如果有，請問是以怎樣的形式授課呢? 2.3 Will the school hold some relevant training on environmental education? What kind of environmental activity is it? 學校會專門舉辦一些關於環境教育的相關培訓嗎?具體是哪一類的環境活動呢? 2.4 If the school has arranged special environmental education training, how is the time arranged? How much is environmental education training scheduled each semester? 如果學校有安排專門的環境教育培訓，時間是怎麼安排的呢?每學期大概會安排多少次環境課程?	
3. Do you think learning environment education is useful? If yes, why? 請問您覺得學習環境教育有用嗎?如果有，為什麼? 3.1 If useful, why? 如果有用，為什麼? 3.2 If you think it is useful, do you think the environmental education you have received or the environmental knowledge you have learned can impress you deeply?	

如果覺得有用，請問您覺得接受過的環境教育知識或者是了解到的環境知識有沒有讓您印象深刻的內容呢？

3.3 If it is useless, why?

如果覺得沒有用，為什麼呢？

Questions for Green Schools:	**High/High/High**
Course：	
Science (High/High/High)	**English (High/High/High)**

1. Will you incorporate environmental knowledge into your classroom? Why?

您會在課堂上融入有關環境知識的內容嗎？為什麼？

1.1 If yes, how did you integrate environmental knowledge into your class?

如果會，請問是以怎樣的形式將環境知識融入到課堂當中的呢？

1.2 Will the school require teachers to dedicate class time to lectures on environmental topics? If yes, how many similar courses will be arranged each semester?

學校會要求老師專門用一節課的時間去講關於環境主題的課程嗎？如果有，請問每學期會安排幾次類似的課程呢？

1.3 If you are the head-teacher, how do you arrange the environmental education content in your class? How long/how many classes will be arranged each semester?

如果您是班主任，請問您是以怎樣的形式安排班會課上環境知識教育方面的內容呢？每學期會安排多長時間/幾次的班會課呢？

1.4 How well do students respond to such a course arrangement? For example, will students gain specific environmental knowledge?

學生對這樣的課程安排反響好嗎？學生是否會收穫到一定的環境知識呢？

2. Have you ever published any articles about the environment?

請問您有沒有發過關於環境方面的文章呢？

2.1 Where is it published? What kind of article is it?

請問是在哪裡發表的呢？具體是哪一類的文章呢？

2.2 If the school requires it, does it require teachers of specific subjects to publish articles?

如果是學校要求，請問學校有要求是具體哪個科目的老師去發表文章嗎？

2.3 If yes, are the school newspapers and journals required to participate in competitions with other green schools?

如果有，請問學校的校報和學校期刊有沒有被要求去參加和其他綠色學校的比賽呢？

2.4 Have you heard about some conditions or requirements for schools to establish green schools?

您有了解過關於學校建立綠色學校的一些條件或者是要求嗎？

3. Will you take the initiative to participate in some environmental activities? What kind of activities?

您會主動去參加一些環境活動嗎，具體是哪一類的活動呢？

3.1 If you only participate in activities held on campus, will you take the initiative to participate in some off-campus activities related to the environment? What kind of specific description?

如果是只參加校園舉辦的活動，問您是否會主動參加一些校外的有關環境的活動？具體說明是哪一類？

3.2 How do you think participating in these activities will affect your life?

您覺得參加這些活動會對您的生活有怎樣的影響呢?
4. Do you think knowing about more environmental knowledge and environmental information will help you want to do something to protect the environment? Yes/No, why? 您覺得了解環境知識和環境信息會幫助您想要去做一些保護環境的事情嗎? 會/不會，為什麼? 4.1 What is the purpose of your actions? 請問您做的這些行為的目的是什麼?
5. Do you think the level of environmental knowledge can affect your environmental attitudes and behaviours? Why? 您認為環境知識的高低是否能夠影響到您的環境態度和環境行為? 為什麼?
6. Do you think that after you have taught in green schools for many years, do some policies of green schools and the requirements for teachers' environmental literacy have a positive impact? Why? 您認為，在綠色學校任教多年，綠色學校的一些政策和對老師在環境素養上的要求是否起到了積極影響呢? 為什麼?

Questions for Green School:	**High/Low/High** **High/Low/Low**
Course:	
Science (High/Low/High)	**Chinese (High/Low/Low)**
1. Will you incorporate environmental knowledge into your class? Why? 您會在課堂上融入有關環境知識的內容嗎? 為什麼? （引導：自願還是學校要求） 1.1 If yes, how did you integrate environmental knowledge into your class? 如果會，請問是以怎樣的形式將環境知識融入到課堂當中的呢? 1.2 Will the school require teachers to dedicate class time to lectures on environmental topics? If yes, how many similar courses will be arranged each semester? 學校會要求老師專門用一節課的時間去講關於環境主題的課程嗎? 如果有，請問每學期會安排幾次類似的課程呢? 1.3 If you are the headteacher, how do you arrange the environmental education content in your classes? How long/how many classes will be arranged each semester? 如果您是班主任，請問您是以怎樣的形式安排班會課上環境知識教育方面的內容呢? 每學期會安排多長時間/幾次的班會課呢? 1.4 How well do students respond to such a course arrangement? Will students gain specific environmental knowledge? 學生對這樣的課程安排反響好嗎? 學生是否會收穫到一定的環境知識呢?	
2. Have you ever published any articles about the environment? 請問您有沒有發過關於環境方面的文章呢 ? 2.1 Where is it published? What kind of article is it? 請問是在哪裡發表的呢? 具體是哪一類的文章呢? 2.2 If the school requires it, does it require teachers of specific subjects to publish articles? 如果是學校要求，請問學校有要求是具體哪個科目的老師去發表文章嗎? 2.3 If yes, are the school newspapers and journals required to participate in competitions with other green schools?	

如果有，請問學校的校報和學校期刊有沒有被要求去參加和其他綠色學校的比賽呢?

2.4 Have you heard about some conditions or requirements for schools to establish green schools?

您有了解過關於學校建立綠色學校的一些條件或者是要求嗎?

3. Are you interested in learning about the environment?

您是否有興趣去了解一些有關環境的信息呢?

3.1 If yes, why do you want to know about it? What kind of information and knowledge you want to know about?

如果有，為什麼會去了解呢？具體是哪一方面的信息和知识呢?

3.2 If yes, is there any aspect of environmental information you have learned that impresses you deeply?

如果有，在您所了解到的环境信息中有没有哪个方面的环境信息是让您印象非常深刻的呢?

3.3 What impact do you think the environmental knowledge and information you have learned have on your life?

您覺得了解到的這些環境知識和環境信息對您的生活有什麼影響呢?

3.4 If not interested, why?

如果沒有兴趣，為什麼呢?

4. Are you interested in participating in some activities related to environmental protection?

您是否有兴趣會參加一些有關於環境保護的活動嗎?

4.1 If yes, why? What specific activities are related to the environment?

如果會，為什麼呢？具體是關於環境的哪方面的活動呢?

4.2 Are there more activities organised by the school, or are you interested in participating in more activities outside the school? If it is an off-campus activity, what kind of activity is it?

參加的活動具體是學校舉辦的多一點呢，還是有興趣多去參加校外的活動呢？如果是校外的活動，具體是哪一類的活動呢?

4.3 Do you think these activities will help you want to understand the environment? Or help you do something to protect the environment?

您覺得這些活動會幫助您想要去了解環境嗎？或者是幫助您做一些保護環境的事情嗎?

4.4 If not, why?

如果不會，為什麼呢?

5. Would you like to do something to protect the environment?

您會有意願去做一些保護環境的事情嗎?

5.1 If yes, please give specific examples of what will be done?

如果有，請具體舉例說明會做一些什麼事情?

5.2 Will you share the information when you know about some environmental issues and environmental knowledge?

您會去分享看到的關於環境問題以及環境知識的信息嗎?

6. Do you think learning more about environmental knowledge can improve your environmental attitudes and behaviour? Why?

您認為學習了解更多的環境知識能夠提高您的環境態度以及環境行為嗎？為什麼呢?

7. Do you think that after you have taught in green schools for many years, do some of the policies of green schools and the requirements for teachers' environmental literacy have a positive impact? Why?

您認為，在綠色學校任教多年，綠色學校的一些政策和對老師在環境素養上的要求是否起到了積極影響呢？為什麼？

Question for Non-Green School:	**High/High/High** **High/High/Low**
Course:	
Science (High/High/High)	**Chinese (High/High/Low)**

1. Will you actively incorporate environmental knowledge into your classroom?

您會主動將環境知識融入到您的課堂當中嗎？

1.1 If Yes/No, why? How do you teach courses related to the environment?

1.1 如果：會/不會，為什麼？您會用怎樣的方式去教授和環境有關的課程呢？

1.2 Will you take the initiative to let students read some articles about the environment in your class, or will you integrate environmental knowledge into the class? Yes/No, why?

1.2 您會在課堂上主動讓學生看一些有關環境的文章嗎或者您會將環境知識融入到課堂呢？會/不會，為什麼？

1.3 If yes, can students learn environmental knowledge through your class content?

1.3 如果有，學生是否可以通過課堂內容學習到更多的環境知識呢？

1.4 How much time will be spent in class in a semester, mainly focusing on environmental issues? Does the school require it, or is it your curriculum? （For asking science teacher only）

一學期會主要針對環境方面的問題安排多長時間在課堂上。是學校要求的還是自己的課程安排？

2. In your life, will you take the initiative to learn some environmental knowledge or read some articles related to the environment? Yes/No, why?

在生活中，您會主動去了解一些環境知識或者是看一些與環境相關的文章嗎？ 會/不會，為什麼？

2.1 If yes, how will you choose to learn about this environmental knowledge and related environmental issues?

如果會，請問會選擇怎樣的方式去了解這些環境知識和有關環境方面的信息呢？

2.2 If you are interested, how do you improve your environmental knowledge?

如果有興趣的話，您會用怎樣的方式去提高環境知識呢？

2.3 Do you know about the green school project? Does your school plan or participate in the selection of green schools?

您對綠色學校有沒有了解呢，您的學校有沒有計劃或者參加綠色學校學校的評選呢？

3. Will you take the initiative to participate in some activities related to the environment? Yes/No, why?

您會主動去參加一些有關環境的活動嗎？會/不會， 為什麼？

3.1 If you will participate, please specify what environmental activity it is? For example, is it on-campus or off-campus?

如果會參加，請您具體說明是哪一類的環境活動呢？是學校舉辦的還是校外的呢？

3.2 Do you feel participating in these activities will help you understand the environment?

3.2 您覺得參加這些活動對您了解環境有幫助嗎？

3.3 Does the school regularly organise some environmental activities for teachers and students?

學校會定期為老師和學生們舉辦有關環境方面的活動嗎?

4. Will you take the initiative to do something to protect the environment? Yes/No. Why?

您會不會主動去做一些保護環境的事情呢?會/不會。為什麼?

4.1 If yes, please give specific examples of what will be done.

如果會,請具體舉例說明會去做哪些事情。

4.2 If yes, what do you think is the purpose of these actions?

4.2 如果會,請問您覺得做這些行為的目的是什麼?

4.3 Do you take the initiative to share some useful environmental information with those around you? Yes/No, why? (For asking teachers with low environmental behaviour scores)

4.3 針對環境行為分數低的老師會問:您是否會主動和您身邊的人去分享一些有用的環境信息?會/不會,為什麼?

5. Do you think knowing more about the environment can help you to do something more to protect the environment? Yes/No, why?

您覺得了解更多的環境知識能否幫助您去更想做一些保護環境的事情呢?會/不會, 為什麼?

6. Do you think knowing more about the environment can improve your environmental attitudes and behaviours? Why?

您認為了解更多的環境知識是否能夠提高您的環境態度以及環境行為?為什麼?

Question for Non-Green School:	**Low/Low/Low**
Course:	
Science	**Ideology and Morality**

1. Do you actively incorporate environmental knowledge into your class? Yes/No, why? (For asking the science teacher)

您會主動將環境知識融入到您的課堂當中嗎?會不會,為什麼?

1.1 If yes, how would you teach courses related to the environment? (For asking the science teacher)

如果會,您會用怎樣的方式去教授和環境有關的課程呢?

1.2 Are you interested in learning about environmental knowledge? Yes/No, why? (For asking the ideology teacher)

您有興趣去了解和環境知識有關的信息嗎?會/不會,為什麼?

If yes, how do you know it? Do you talk about the environmental issues in your class? (For asking the ideology teacher)

如果會,您會用怎樣的方式去了解?您是否會在自己的課堂上講到關於環境方面的知識呢?

2. Are you interested in participating in some activities about environmental protection or promoting environmental knowledge? Yes/No, why?

您會有興趣去參加一些關於環境保護或者是宣傳環境知識的活動嗎?會/不會, 為什麼?

2.1 If yes, what kind of activities do you want to participate in?
如果會,具體是哪一類的活動呢?

2.2 Are there any memorable activities?
有沒有哪些印象深刻的活動內容呢?

2.3 Does the school provide some environmental protection activities for teachers and students?
學校會為老師和學生們提供一些環境保護的活動嗎?

2.4 Yes/No, do you encourage schools to hold more similar environmental protection activities?

會/不會，您會鼓勵學校多舉辦類似的環境保護活動嗎?
3. Are you interested in taking the initiative to do something to protect the environment? Yes/No, why? 您會有興趣主動去做一些保護環境的事情嗎？會/不會， 為什麼? 3.1 If yes, please specify what you will be doing? 如果會，請您具體說明會做什麼? 3.2 What is the purpose of doing these actions? 做這些行為的目的是什麼呢?
4. 4. Do you think learning more about the environmental knowledge can improve your environmental attitudes and environmental behaviours? Why? 您認為學習了解更多的環境知識能夠提高您的環境態度以及環境行為嗎？為什麼?

Appendix 5

Interview Transcript for Teachers' Environmental Knowledge, Pro-environmental Attitudes, and Pro-environmental Behaviours for Chapter 5 (Part 3)

English Edition

G1 Science Teacher

*Speaker 1: First of all, I would like to introduce that this study is mainly about teachers' environmental knowledge, attitudes, and environmental behaviours in green and non-green schools in Zhengzhou City. It is a great honour to invite you to be our interview guest for this survey. This interview will last about 20 to 25 minutes. Thank you again for sparing your precious time for this interview. Let's start right now. If the signal is not good during the interview, or you have any other questions, please feel free to ask me. Thank you. First, I would like to ask you, which subject are you currently a teacher of?

**Speaker 2: Science.

Speaker 1: Ok, so you know that your school became a green school in 18 years, so before that, you experienced how the school went from a non-green school to a green school, right?

Speaker 2: From what I learned here is rough, in the general direction, as unceasing economy development, and puts forward the construction of ecological civilization such an overall goal, the whole mainland China to pay more and more attention to environmental protection, under this significant circumstance, I remembered not clear, maybe in around 2015, the education bureau issued this document, which put forward such a requirement for the selection of green schools in Zhengzhou City. With the certification of the green school standards published in the document, and even scoring rules have been issued, after the promulgation, each school according to such a standard to implement. In doing so, the education bureau will print documents comparing municipal-level and provincial-level green schools. In this case, each school wrote some of their work on some practices and wrote a report to the education bureau. The education bureau assigned the evaluation supervision group to each school inspection evaluation and following the scoring of the detailed scoring rules. After the assessment, it was reported to the education bureau. On this basis, some green schools were selected in Zhengzhou City. That's about all I know.

Speaker 1: You have a comprehensive understanding of the green school project. May I ask if you are the head-teacher of a class at present?

Speaker 2: Not at the moment.

Speaker 1: Ok, I would like to know something about your background. In your educational experience, have you received environmental education, or any training related to environmental education?

Speaker 2: According to my academic background, when I was in university, our courses were branched into environmental sciences and natural sciences. Our teachers would take us to nature and let us feel the importance of the environment from nature. So I had, of course, received a systematic education in natural science a few years ago. After attending a job, the education bureau should organise teachers of each subject to go to different colleges and universities respectively, especially during the summer vacation, to receive systematic training

related to this subject, which can also be called continuing education. Therefore, I have participated in an activity on natural science many times.

Speaker 1: What kind of teaching format is this training? For example, could it be a course, seminar, or event?

Speaker 2: It includes both classes, lectures, and some seminars.

Speaker 1: Because your school is a green school, does your school hold special training on environmental education?

Speaker 2: Yes, to show itself as a green school. Because in each academic year's education and teaching process, different bro-schools will come to our school to visit and learn, depending on what you have to know in green school construction. The school also attaches great importance to this area, so regularly relevant training will be carried out.

Speaker 1: Sessions per semester, month, or week?

Speaker 2: If it is normal teaching and research within the teaching and research group, it happens every week. Under the significant circumstance of the school, it usually occurs once a month or twice a month.

Speaker 1: Ok. What kind of specific environmental activities are they? Is it like environmental protection or environmental education, or something else?

Speaker 2: That's a lot. In the context of the school, the school will hold relevant training courses on environmental education every two months. Sometimes, some professionals will be invited from outside the school. For example, some experts and environmental science professors will come to the school to set up relevant training courses and lectures. Sometimes, some workshops will be held in the school, and teachers will share the important content that we have learned in class. In addition, there will also be some activities to organise school students and relevant departments to carry out education on the protection of the Yellow River and so on.

Speaker 1: OK, I have a general idea. Do you think that just these activities or environmental education will significantly help you in your life? Or do you think it will be helpful?

Speaker 2: I think it's very useful. This is not only to teachers' personal quality, and professional quality has been further improved but also to students' awareness of environmental protection has been further improved. I think it is crucial to enhance the understanding of environmental protection. Because, after all, in the context of China's economic development, people did not pay attention to environmental protection in the early years, although the economic growth, environmental damage, and pollution were severe. At that time, students' awareness of environmental protection was not high. As teachers of science subjects, we also hold teaching seminars with other teachers every week. The topics of the teaching seminars are different each time, and we will also conduct special seminars on environmental topics. Therefore, I think through some activities to improve people's awareness of environmental protection, improving the environmental protection awareness of the whole society is particularly important.

Speaker 1: OK. In terms of the environmental education which you have received or the environmental knowledge which you have learned, do you have any content or activities that leave you a deep impression?

Speaker 2: For example, I came back to talk about the protection of the Yellow River. I spoke about the pollution problem of the Yellow River. The Yellow River is the river that Zhengzhou people rely on for survival. In the early years, the pollution of the tributaries of the Yellow River was a severe problem. Therefore, the school responded to the initiative of the Environmental Protection Bureau and organised teachers and students to participate in activities to protect the Yellow River. The activity is mainly to go to the Yellow River Museum to learn about the current pollution problem of the Yellow River. As teachers, we need to lead by example to protect the Yellow River. Therefore, we will voluntarily organise students to go to the Yellow River to clean up garbage. Therefore, it is urgent to improve people's awareness of environmental protection and take some measures to protect the environment. As far as we know, relevant departments formulate the Yellow River Protection Law to protect the Yellow River by law. So, before the law was promulgated, we also strengthened the cultivation of students' knowledge about rivers and water pollution. The purpose is to improve students' awareness of environmental protection.

Speaker 1: Ok. I just want to have a more detailed understanding of you. Will you integrate environmental knowledge into your class? Do you do this voluntarily, or are you required to incorporate environmental knowledge into the class?

Speaker 2: There are two stages here. In the early years, I would say, we taught science before the green school competition. Natural science, including animals, and plants, of course, is also involved in environmental protection. Therefore, in our daily education and teaching process, it can be said that we consciously or unconsciously integrate environmental protection education content into daily education and teaching courses. After the school becomes a green school, on the one hand, we have such conscious action. On the other hand, we strengthen some education on environmental protection awareness.

Speaker 1: Ok. As far as you know, does the school have to require every subject teacher to integrate environmental education into the class?

Speaker 2: This is involuntary because, after all, during the green school evaluation process, you have strengthened the education of all teachers on the away of environmental protection. Therefore, for our school, the teachers' awareness of environmental protection and overall environmental quality is relatively high in Zhengzhou City. Under such a premise, including teachers of various disciplines, it will constantly grasp any system in education and teaching and carry out knowledge on environmental protection.

Speaker 1: Do students respond well to this kind of teaching? More receptive to some environmental knowledge?

Speaker 2: It's still in two stages. It used to be rigid classroom teaching, but now it's much better. Not only the application of multimedia, plus all kinds of outreach training, and I just mentioned that you need to protect the Yellow River, sometimes you will also go to the Yellow River resort to pick up garbage, propaganda, and education to improve people's awareness of caring for the Yellow River and so on. So the combination of various activities is very popular among students, and they are also willing to participate in them.

Speaker 1: As for the activities you just mentioned, is it required by the school, or is it something that every teacher consciously wants to do?

Speaker 2: It's both. The green school we are now in will hold some activities that require teachers to participate. I am very interested in these activities. There are specific requirements from the school, and under these requirements, teachers brainstorm their ideas. Each has used its resources to carry out various environmental protection activities.

Speaker 1: OK. As far as I know, it will also ask teachers to publish more articles about the environment in terms of green schools. Have you ever sent any articles about the environment?

Speaker 2: Yes, but not many. The main reason for me here is that there are not too many such publications, so there is no place to publish them after they are written, or it is difficult to find a place to post them.

Speaker 1: And if you did, where was it published, for example, in the school newspaper, in the school journal, or some other places?

Speaker 2: It's in the school newspaper, but it also has its website. In addition, we want to evaluate professional titles in need; we want to be similar to the science of such a national publication.

Speaker 1: OK, if there is a requirement from the school, does it specify which subject teachers must publish such articles?

Speaker 2: Such requirements are not much, but for the sake of the teacher's personal development, they will volunteer to complete the task of publishing articles in related journals.

Speaker 1: Will they represent their school in the contest? I mean the competition between green schools.

Speaker 2: After the article wins an award in a publication, it will enter a competition.

Speaker 1: OK, I see. So, for yourself, would you take the initiative to participate in some environmental activities?

Speaker 2: Yes, of course. In the process, we just talked about not only the requirements of the school but also the needs of society. Our school often carries out some environmental protection activities with the community, so it has become a voluntary action of all our teachers and students.

Speaker 1: How have these activities affected your life?

Speaker 2: I feel that my awareness of environmental protection is constantly improving in my personal life. I will be aware that a specific behaviour will harm the environment in my daily life, so I will not do it.

Speaker 1: So, you would take the initiative to do something to protect the environment, right? Are there any specific examples? For example, if you want to choose green travel to reduce your carbon footprint, are there specific examples?

Speaker 2: Yes. Take my family, for example. The car in my family is often doesn't use. Our family travel by subway, bus, and other means of transportation. I will choose green travel to reduce carbon emissions because the greenhouse effect caused by carbon dioxide is too severe, I will carry my shopping bags instead of using plastic bags because this can reduce white pollution, and I will turn off the power or turn off the lights to reduce light pollution.

Speaker 1: OK, so what do you think is the specific purpose of what you are doing, umm…what you are doing to protect the environment? I mean, what kind of environmental problems might he solve?

Speaker 2: That's what you talked about just now, reducing carbon emissions and avoiding the greenhouse effect to a large extent. If you can do your best to protect the environment, that is also a significant thing.

Speaker 1: What do you think of your environmental knowledge? It means whether your environmental knowledge can affect your environmental awareness and your behaviours of protecting the environment.

Speaker 2: I think it is inevitable that if you have received education about environmental protection, you will be deeply branded with the importance of environmental protection from the deep part of your mind. If you do not receive appropriate education, it will not reach such a high level in the whole realm of thought. It will become very passive in certain behaviours, let alone change its attitude and behaviour.

Speaker 1: So, do you think learning about the environment has something to do with your environmental awareness and behaviours?

Speaker 2: That's for sure, and it's imperative.

Speaker 1: I would like to end by asking you, over the years that you have been teaching in green schools, do you think that green schools' development policies and selection criteria have a positive impact on the environmental literacy of teachers?

Speaker 2: As far as I am concerned, it has a positive impact. With the in-depth evaluation of green schools in Zhengzhou City, it is finished at one time. Each school will be evaluated according to the assessment of green schools of different levels to better understand their development in green education and the awareness of environmental protection.

Speaker 1: You are encouraging the green school project to thrive in Zhengzhou City, right?

Speaker 2: Right. Not only our discipline, not only our school, but now more and more people have realized the significance of developing green schools for environmental education towards protecting our environment.

Speaker 1: Ok, I know something about you. Thank you very much for cooperating with me to finish this interview. Our interview is over.

Speaker 2: Thank you.

G2 English Teacher

Speaker 1: I would like to make a brief introduction first. I am currently researching the environmental literacy of teachers' environmental knowledge, attitudes, and behaviours in green and non-green schools in Zhengzhou city. It's a great honour to have you as our interview guest. I will begin our question in earnest so as not to delay your time because I know you are usually quite busy teaching.

Speaker 2: OK.

Speaker 1: Maybe the network signal is terrible, but if you can't hear clearly, you can tell me.

Speaker 2: OK, got it, no problem.

Speaker 1: May I ask what subject you are teaching now?

Speaker 2: English.

Speaker 1: So, how long have you been teaching?

Speaker 2: 6 years.

Speaker 1: OK, I'd like to have a general idea. What is your highest degree at present?

Speaker 2: I majored in English education when I was an undergraduate.

Speaker 1: Have you taught any other subjects in other schools before teaching this English subject?

Speaker 2: No, it's always English.

Speaker 1: OK, when did you come to teach at this green school?

Speaker 2: Let me see, it was around 2016.

Speaker 1: So, your school wasn't a green school before you came to teach here?

Speaker 2: Yes.

Speaker 1: OK. I would like to have a general understanding. Although you have not received such a background in environmental education, have you received any training related to environmental education?

Speaker 2: Yes, I have attended relevant training since I came to our green school. Since the school requires regular exercise for leaders and teachers every year, I have been trained as a class teacher in the future. Other teachers can also participate in the training voluntarily because I am interested in it, so I will attend similar training as long as I have time.

Speaker 1: OK, I get the idea. What is the form of the training you have attended? Is it like a class, or does it have events for teachers to go to?

Speaker 2: Basically, the courses are conducted in the form of environmental protection training. And The school will hold two related environmental training courses every semester and ask teachers to hold seminars to discuss some environmental-related content. These activities are voluntary participation by teachers.

Speaker 1: OK, in terms of this time, does the school hold such training regularly? There is a policy requirement for that, right.

Speaker 2: Yes, as far as I know, green schools should have such training on environmental protection, and our school is also actively responding to such a policy requirement, so we carry out such activities every semester and hold such training regularly at the beginning of the semester. In addition, the school will often invite some experts outside the school to explain environmental topics, which are carried out around environmental protection.

Speaker 1: What is the approximate number of times? Is it held regularly each semester, or is it routinely held many times each semester?

Speaker 2: On average, twice a semester, about four times a year.

Speaker 1: That's a pretty high frequency.

Speaker 2: That's right.

Speaker 1: OK, I want to know again, do you feel that environmental education has helped you? Or is it useful in your life?

Speaker 2: Yes, because I have wanted to take part in it since the beginning. I think the knowledge it talked about is helpful for me to teach relevant expertise to my students and closely related to my life. As for my previous major, I still have a little blind spot in these aspects. Now, people's attention to the environment has also aroused my interest. The acquisition of this knowledge has given me a deeper understanding and made me feel that I should take action. Therefore, it has had a significant influence on me.

Speaker 1: Now that you've said that it's helpful in your life, are there any memorable themes or contents of the environment that you feel are useful and relevant to your life?

Speaker 2: But the most relevant, I would think that at present the country is doing plastic, the reduction is to reduce the activity of the application of plastic bags, because this is the most let I sincerely feel it is closely linked with us, because of Marine pollution from is part of a seminar, I saw many sea creatures, for example, sea turtles, sea birds, it is because we have discarded plastic garbage, When they eat them, they die horribly. And the proportion of such incidents gradually increases every year, which makes me feel shocking. So I think we are indeed destroying the environment, and we must reduce plastic. So from my point of view, I will reduce the use of plastic bags. Usually, I will subtly teach students to do such a, well, it is a behaviour of environmental protection.

Speaker 1: So, you encourage schools to carry out more relevant training, right?

Speaker 2: Yes, because it's true that these pioneering things will give us a different understanding, so I think it's necessary.

Speaker 1: OK, as far as I know, will you try to incorporate some environment-related knowledge into your class?

Speaker 2: In my class, as you know, I teach English as an English major, so it's not so easy to integrate into a traditional style. So I'm going to look for some interesting extra-curricular readings on these topics based on um…wind power. Through extra-curricular reading, we can trigger analysis and discussion, teach them how to protect the environment, and see if they have the consciousness to do such a thing.

Speaker 1: That means you want students to know more about the environment.

Speaker 2: Yeah, I think we can only lead by example, but children are still growing up, and their consciousness has a significant impact on their future.

Speaker 1: So, do they have some requirements in terms of green schools? For example, how much time do you have to be involved in environmental education in the course this semester?

Speaker 2: This is no hard and fast requirements because is different disciplines, or with varying processes according to you, you do it is complicated, but the school will encourage teachers to do this, so when we at the beginning of each semester when we were training or seminar, the school will mention it, to encourage teachers with some innovative, divergent thinking to blend in. So there's no hard and fast time you need to fit in, but you're encouraged to do it.

Speaker 1: One of the things that I'm looking at is the students. Do they have an excellent reaction to the arrangement of the course, or what is their response? Will you be able to gain a degree of environmental knowledge?

Hello, can you hear me now… (Engaging…)

Sorry! Let's continue. How do students react to your lectures? Are they going to get a little bit more environmental knowledge?

Speaker 2: I think it's a design like this. The course design mainly lies in that when the teacher makes an exciting design according to the understanding of the students and the student's preferences, the students' feedback is excellent. In this process, they will also think positively. After positive thinking, they will naturally tell a lot of their understanding of the environment and what they should do in the future when discussing. Just like when I show them the turtles who died from eating plastic bags, they will feel sad. They will think that I will definitely stop littering, reduce the use of plastic bags, and so on. So I think it's very effective for them. Children will gradually set up such a sense of environmental protection.

Speaker 1: OK, thank you very much for your contribution to environmental protection. I would like to continue to learn about you ever published some articles about the environment, is not a kind of paper, the equivalent of your own some comments may be helpful to the environment, will not be in the newspaper or the public can see the river is very famous, like those of the journal of some of these comments.

Speaker 2: As far as I am concerned, since I am an English major, I will actively write about my teaching experience and one of this semester's, um... Some of the things the students have done, including some of the creative waste utilization of the students do some handwork, design, and then carry out a related description and output of the article. However, I did not publish it in Dahe Daily. Still, I know that special teachers in our school are majoring in science. Those teachers who have a deeper understanding of these will regularly make some contributions and give a good display of our school's current achievements.

Speaker 1: Will your school newspaper, periodical, or the school newspaper, be required to participate in some selection or let more people know?

Speaker 2: It needs to be seen its just, uh... this one that you wrote is going to be very influential, and it will be, but let's see if it fits into a specific theme of the day.

Speaker 1: I see. Are you here voluntarily, or are you required to do so? It looks like the connection's a little shaky. Hello. Hello…

Will you know something about the requirements for applying for a green school?

Speaker 2: Yes, because as head-teachers, we need to understand such a condition, which is helpful to our curriculum arrangement, and also willing to say how to make the school meet the standard every time and make efforts.

Speaker 1: What kind of conditions do you have in mind?

Speaker 2: Generally speaking, I think it's really about infrastructure, the environment's infrastructure, things like greenery, things like equipment, and sanitation in schools, to see if there's any pollution. On the one hand, for teachers and school leaders, there may be administrative requirements on them; they may need to prepare materials and then carry out some education. On the other hand, we will be given training for us teachers, and we need to integrate into the classroom. The school will also hold some special activities, such as using this plastic bottle for some creative handwork and so on, as well as some other practical activities, such as students can participate in some greening, beautification, and recycling organised by the school.

Speaker 1: Well, the school is quite comprehensive.

Speaker 2: The school will have such a plan and pass it on. But in fact, every step of the infiltration down, quite consciously integrated into the, there is not so much pressure.

Speaker 1: So do you think that knowing more about the environment, or being involved in so many environmental activities, makes you want to do something more to protect the environment?

Speaker 2: Certainly, because we are interested, of course, not in the theory, but the sense that it is relevant to us. And then we should focus on why we're warming the planet, why we're emitting so much carbon dioxide that's changing the environment. These problems, such as PM2.5 in Beijing, which can be connected with our daily life, make me think that I can combine environmental knowledge and make myself take action. We also hope that our students can carry out a corresponding environmental action through such learning later.

Speaker 1: What kind of things would you like to do? Be more specific. For example, if you know that carbon emissions may significantly impact our living environment, will you reduce carbon emissions and do some activities to reduce carbon emissions, such as choosing green travel and so on? Have you done any specific things like this?

Speaker 2: Actually, I think what I do a lot is recycled things like plastic bottles. I should try to reduce such use and not consume too many plastic products. After that, the next step is to recycle it and collect it, and then we hope that the paper will not become garbage but become a recycling process. Therefore, this is what I do more in my life, and I will also pay attention to green travel. However, because Zhengzhou City has four distinct seasons, I usually choose a way of travel like a bicycle in spring and autumn to reduce carbon emissions as far as possible.

Speaker 1: So, your goal is to reduce air pollution. Then we will do everything we can to help protect our environment. So, it's still meaningful for you to do these things.

Speaker 2: Yes, I think it means that I may not be able to see much change on my own, but because we, as educators, can spread our message to more children, children will also influence others around them, which will have an enormous impact.

Speaker 1: Good. I also want to know; do you take the initiative to participate in some activities like environmental protection?

Speaker 2: Some of the, um…if I say some of the non-school seminars are more, um…how to say academic seminars, I don't attend them. But I would hear about some events like those one-hour events and paste in; I would be a part of it.

Speaker 1: Ok, I would like to end with a question: Do you think your environmental knowledge can affect your environmental awareness and behaviour?

Speaker 2: I would say absolutely because I know from my own experience and years of teaching kids that we don't know what to do until we know what to do. Just as we never knew about plastic, one plastic bag we threw away could kill a turtle. So after we see this thing, we will start with ourselves; we will also realize that this is related to environmental protection, and we need to have such a sense of responsibility. So I think this environmental knowledge will bring us a significant change in environmental awareness.

Speaker 1: So I would also like to know whether you think the university's current green school policies or some conditions are helpful for your understanding of the environment.

Speaker 2: Now, yes, this helps.

Speaker 1: Ok, thank you very much for your answer and support for this study. That's the end of our interview, thank you, and finally, thank you very much for answering my questions.

Speaker 2: Ok, bye.

G3 Mathematics Teacher

Speaker 1: Thank you very much for participating in the interview part of our study. First of all, please allow me to briefly introduce the research content. This research mainly studies teachers' environmental literacy in green schools and non-green schools in Zhengzhou City. Thank you very much for sparing your precious time cooperating with my investigation. Thanks a lot.

Speaker 2: Good.

Speaker 1: I'm just going to briefly ask you a few questions about your background. First, I would like to know which subject are you currently teaching?

Speaker 2: The subject I am currently teaching in mathematics.

Speaker 1: Math, right? So how long have you been teaching math?

Speaker 2: I have been teaching for about nine years.

Speaker 1: What is your educational background?

Speaker 2: My highest degree is a Master's.

Speaker 1: Ok, and what is your major?

Speaker 2: My major is mathematics.

Speaker 1: Is it math education?

Speaker 2: Mathematics education, right.

Speaker 1: Good.

Speaker 2: I also studied psychology as an undergraduate major.

Speaker 1: An undergraduate in psychology. Ok, you've covered a lot of fields. Have you taught any other subjects before?

Speaker 2: Not at the moment.

Speaker 1: You have been teaching math for nine years, right?

Speaker 2: Right.

Speaker 1: Ok, I want to know, when did you come to teach in the green school?

Speaker 2: I came right after graduation.

Speaker 1: So that would mean something like 2015-16 or so, right?

Speaker 2: Thirteen years should be. 2012-13 or so.

Speaker 1: Ok, so you're experiencing a change from a non-green school to a green school, right?

Speaker 2: Yes, our school applied to the green school in 2016.

Speaker 1: Ok, what do you think about this change?

Speaker 2: First of all, as a head-teacher, I think green school is a trend in the future.

Speaker 1: Good.

Speaker 2: But from a pedagogical point of view, I think it's a little bit Umm…not necessary.

Speaker 1: I understand; that is to say, when you go through this change, you are still based on the school's requirements, right?

Speaker 2: Yes, I am based on the school requirements.

Speaker 1: Ok, may I ask you, have you received any training related to environmental education or environmental knowledge?

Speaker 2: Our school will organise it.

Speaker 1: That is to say, in addition to the school organisation, they did not participate in other training, right?

Speaker 2: Yes.

Speaker 1: What is the form of teachers' training?

Speaker 2: The school will use the holiday time, for example, National Day, winter, and summer vacations, to provide relevant environmental training for teachers, and all headteachers of a class must participate. It wasted a lot of my time. Um…school will organise some activities, will give teachers training on how to teach students in the environmental protection consciousness, like this kind of education.

Speaker 1: I see. That is, the format is mainly in the form of a seminar. People sit down and discuss, see if there are any of their ideas, right?

Speaker 2: Yes.

Speaker 1: I want to know if the school will hold some special training about environmental education, right?

Speaker 2: Yes, we will organise some training.

Speaker 1: What kind of training would it be?

Speaker 2: It's just like, um... Our school may be more traditional, but we are still based on the documents issued by the Education Bureau. So, we will focus on these documents. So, for example, this document may involve environmental protection of some schools and the appearance, appearance, and cleanliness of schools.

Speaker 1: Are there any projects and policies given by some green schools, and then some activities designed?

Speaker 2: Yes, like us, we pay more attention to water saving, food saving, and garbage sorting.

Speaker 1: Good. How does a training school like this arrange this time?

Speaker 2: As I just said, we will take advantage of the teachers' time off, and the students have already taken their time off.

Speaker 1: That's summer and winter vacation, right?

Speaker 2: Our teacher will arrange duty in the winter and summer holidays, including some holidays. When on duty, we may call everyone to hold a meeting to discuss the recent results or report the situation of each class.

Speaker 1: In other words, it will not disturb the standard teaching time, right?

Speaker 2: No, we don't use regular school hours to do this.

Speaker 1: Ok, so the requirement is that all teachers must attend, right?

Speaker 2: Yes, we require the head-teacher to attend all the above. But mathematics as the main subject has many tasks to be completed, if you go to participate in such activities or some training courses, this is a great waste of time for teachers, but there is no way.

Speaker 1: Ok, I get the idea. Do you think it's helpful to learn in this environment? How practical was your environment-related training?

Speaker 2: I don't think it's very effective for teachers, because it seems to be a kind of method stipulated by the education bureau, but, in our daily life, we can't follow it completely, we just want to, well, to put it crudely, to deal with the education Bureau.

Speaker 1: I see. That means it's mandatory.

Speaker 2: Yeah, we have mandatory requirements, and like in some cases, you know, like I think, um…like campus, it's going to take a lot of people's time, or it's going to take a lot of people's time, including you know, cleaning the campus and using water. I don't think it's a

very green rule, but it requires a certain level of tidiness. For example, the sanitation level involves a lot of water, manpower, and material resources. So, I think it consumes resources. That is to say, one of the things he doesn't want is to advocate green.

Speaker 1: Ok, I get the idea. Is it possible that some teachers think that environmental education is useless because they don't understand it well enough?

Speaker 2: I don't think we have a deep understanding of environmental education. But, still, I think teachers may not be willing to accept the current policy.

Speaker 1: See, there are some mandatory requirements for the environment for the teacher, which is not quite acceptable, right?

Speaker 2: Yes.

Speaker 1: Ok, I have a general understanding of your basic information. Now I want to know more about what you do in class. May I ask whether she would integrate green education or environmental education into her class?

Speaker 2: Hardly any.

Speaker 1: The school doesn't have that requirement?

Speaker 2: Yes, science subjects, such as mathematics, may not be so demanding. However, humanities subjects, such as Chinese, may have requirements.

Speaker 1: Okay, because I just learned that you are a teacher of a headteacher. In fact, as a head-teacher, does the school require you to arrange the content of environmental knowledge education in-class meetings?

Speaker 2: Our school requires this. Students will be given knowledge about the educational environment. We have a class meeting once a week, and the theme of the class meeting is different every time. Maybe once a month, if we're talking about the environment, we might have a class meeting about the environment.

Speaker 1: Does the school require this, or are you willing to arrange the course like this?

Speaker 2: The school requires it.

Speaker 1: If there is little involved in the content of the environment through your will, is it?

Speaker 2: Yes.

Speaker 1: I see. If you arrange these contents about the environment in the class meeting, will students have a good or bad response?

Speaker 2: It's okay because the kids might be interested in it.

Speaker 1: Because they will be interested, that is to say; students can still gain some environmental knowledge through the content of the class meeting, right?

Speaker 2: Yes.

Speaker 1: Good, I also want to ask; I understand that some of the criteria for green schools require teachers to publish some well-known journals or newspapers or articles about the environment. Have you published any of these articles?

Speaker 2: I have not published this article because our school does not have this requirement.

Speaker 1: Your school is your green school is not very strict about this.

Speaker 2: Yes, we don't have any requirements at present. Generally speaking, Chinese teachers may write relevant articles or have similar education. Still, our math teachers don't have any at present.

Speaker 1: Okay, if you have read too much about the conditions or requirements for schools to set up green schools.

Speaker 2: I understand because they all sent documents to the headteacher.

Speaker 1: Okay, so what kind of a requirement is that?

Speaker 2: Several points system, such as school system, including the education management of the class, and the site evaluation, education bureau will send someone about you like to come over the requirements of the school system, it may probably set up some green schools introduced the management system, the school has a policy, such as our school including safeguard measures, this kind of incentive mechanism is the school required.

Speaker 1: Understand.

Speaker 2: For management, we will, for example, publish related articles in the publicity column, including posters and slogans, as our radio station regularly publishes relevant articles. That's about it.

Speaker 1: Okay, are you interested in learning something about the environment?

Speaker 2: I don't have the need right now.

Speaker 1: So what's the probable reason?

Speaker 2: Maybe I didn't feel able to do something that I thought was necessary for me. There's no need.

Speaker 1: Do you think the environment is still a relatively high level a topic? It's empty, isn't it? So if you want to know, it's school policy.

Speaker 2: Yeah, school rules or government rules, that kind of thing. I may not have the time or interest.

Speaker 1: Because this thing is still a long way away, right?

Speaker 2: Yeah, we're under a lot of pressure, and if you're doing something like this, it might affect the quality of our teaching.

Speaker 1: Good I would also like to know whether you are willing or interested in participating in any activities related to environmental protection.

Speaker 2: Maybe if we have time, but now we are busy, because the pressure of teaching is also relatively high. Now it is the end of the year, and we still mainly focus on education. Personally speaking, I have very few holidays. I still focus on students.

Speaker 1: I also want to know; will you be willing to take the initiative to do something to protect the environment?

Speaker 2: If there is a requirement from the government, such as garbage sorting, I may share it with you. But you said deliberately to do something to protect the environment; I seem not. Not too deliberately.

Speaker 1: Because I still don't feel like I fit in very well with my life, do I?

Speaker 2: Right

Speaker 1: Okay, if the school has to ask the teacher to do something, you will do it according to the school.

Speaker 2: Yes.

Speaker 1: Also, will you share some information about environmental problems and environmental knowledge with people around you?

Speaker 2: Probably not. It's probably mandatory, but if it's not, we usually don't. So I'm not particularly interested in that.

Speaker 1: Right, because the quality of the teacher's teaching is usually very high, right?

Speaker 2: Right.

Speaker 1: Okay, I also want to have a general idea. Do you think that learning environmental knowledge can improve your environmental attitudes and environmental protection behaviours?

Speaker 2: I don't think so. I think I'm generally a little bit more rational, and I think if I do something that will be particularly good for the environment, I might do it. But if it's something that I think I'm doing very little, or if it's the other way around. It's probably not going to have an outstanding impact on the environment; I probably won't do it. Let me give you an example. For example, the current government will promote some electric cars. The publicity is to do green energy for environmental protection. But in my opinion, if you generate electricity now mainly from thermal power, I think you will produce more waste gas. So I don't think it will improve the environment very much. So I'm not going to do something based on that, like buy an electric car.

Speaker 1: It's really because it can only be said to achieve an ideal state, but it's challenging to implement.

Speaker 2: Right, because it didn't work out as well as everybody thought. After all, unless we switch to wind power now, it could impact the environment. But now, it's primarily coal-fired power. So the carbon dioxide emissions should not be too wrong with fuel cars.

Speaker 1: Yeah, yeah, that's a significant environmental factor. Although science and technology the continuous progress, there will still be an ideal state we can not reach. Still, I think your understanding of environmental knowledge is quite rich.

Speaker 2: Yes, yes.

Speaker 1: Okay, my last question is whether the policies of green schools and the requirements on teachers' environmental knowledge or environmental awareness and behaviours have had a positive impact after teaching in green schools for so many years.

Speaker 2: I think that some systems are not very well. So I don't think they are beneficial for this.

Speaker 1: Are some still less helpful?

Speaker 2: Yes, you are advocating green buildings or too much greenery on campus. I think some school policies do not seem to be able to protect the environment. For example, the planting area of vegetation in green schools must reach 37% or more, which many schools cannot achieve. Moreover, the water resources used to irrigate this vegetation are not recyclable, which will largely cause more water waste. Of course, this is only my personal opinion. Yeah, and things like sanitation, if you're going to judge a school as green or not because of something like that, I think there's something wrong with the grading system because it counts a lot of points. So, yes, there is a specific negative impact, which will make people misjudge one view of green schools.

Speaker 1: Okay, I have a detailed understanding of your situation. Thank you very much for cooperating with me to complete such an interview and such a study. Thank you.

Speaker 2: Okay, that's all right.

G4 Chinese Teacher

Speaker 1: Sorry, we just had a glitch. Let's continue. You just mentioned that you have been teaching for about 20 years. I would like to have an interview with you about your educational background. What is your educational experience? What is your highest degree, and what subject did you study in university?

Speaker 2: Well, Master. I have been studying Chinese education, so I have always been very interested in Chinese education.

Speaker 1: OK, good. I was also wondering, have you taught any other subjects before? For example, before engaging in language education. Did you teach any other subjects, and if so, what subjects did you teach?

Speaker 2: I did not teach other subjects before receiving Chinese education because, as I said before because my background is Chinese education, so I came to the school after graduation and have been engaged in Chinese education, not teaching other subjects.

Speaker 1: OK, when did you come to teach in this school?

Speaker 2: I came to teach in this school almost after graduation, which must have been around 2000. Therefore, since I came here, I have been arranged to be the teacher of Chinese subjects, so I still have specific opinions on Chinese subjects.

Speaker 1: OK, thank you very much for your answer. So, before you came here, this school was not green, was it?

Speaker 2: Right, because when I came here, it was relatively ordinary, and the green building area and something else was not as prosperous as it is now. Since 2000, when the school was just established, I have seen significant changes in the school, and its green infrastructure has been dramatically improved during the process from a non-green school to a green school.

Speaker 1: OK, thank you very much for sharing so much information about the school. I also want to ask, are you the headteacher at present?

Speaker 2: At present, I am the school's headteacher because the school will arrange the teacher of the main course, such as Chinese, mathematics or English teacher in charge of the class, which can be convenient for me to select a title in the later stage. The school also has such a requirement.

Speaker 1: OK, now that I have some basic information about you, I would like to ask, have you received any training related to environmental education or environmental knowledge?

Speaker 2: If it was during my undergraduate or master's study, I did not receive such relevant training. Because I have always been a liberal arts student, I did not receive environmental education before the school became a green school, and I did not have the opportunity to be exposed to environmental education.

Speaker 1: OK, OK, I get the idea. May I ask what kind of environmental training you have received?

Speaker 2: After the school becomes a green school, it will arrange environmental education courses for all teachers once a week and arrange environmental protection activities once a month. The purpose is to cultivate everyone's behaviours to protect the environment. Sometimes the school will hold some activities for teachers to take students to participate in these activities.

Speaker 1: I get it. That is to say, one of your primary ways is also teaching, right?

Speaker 2: Yes, teaching is relatively important. Every semester, the school will arrange about one class a week for teachers to have some training on environmental knowledge when the curriculum arrangement of teachers and school curriculum arrangement is not so tight.

Speaker 1: OK. That is to say, and the school will hold some activities related to environmental education for teachers, right?

Speaker 2: Yes. Sometimes there are not only some classes but also some activities. For example, teachers need to take students to participate in some afforestation activities. They need to complete some environment-related projects with students. This topic is relatively simple because we are based in primary school. Therefore, this topic is simple.

It will teach some students how to protect the environment such a kind of knowledge.

Speaker 1: OK. I have a general understanding of it. I also want to know if the school arranges such special environmental education training. As you said just now, it is about one class every week, right?

Speaker 2: Yes, specific still depends on the teacher's arrangement, the teacher can choose to attend. Still, the school each semester at the specified time every week to arrange a lesson, if you don't have time to go to that time, you will need to go to complete your task first. And then go to an environmental training course, like this. Umm…It's going to look something like this.

Speaker 1: OK, OK. Do you think that learning environmental education is related to receiving such training in such an environment? Is it of great use to you personally? Why?

Speaker 2: It is very useful because protecting the environment is what we must do now. A few years ago, we also knew that there is a lot of haze in Beijing, which significantly impacts our health. We can assume that factory exhaust and vehicle exhaust are to blame in most cases. These factors can lead our physical fitness into a very serious situation. So I think after learning environmental knowledge, I think I should know how to protect our environment. Umm…From which side to start…So not only from such an environment as we live in but also for our health and the development of human beings are very useful.

Speaker 1: After listening to you, I feel that you have a kind of training for such an activity and have a relatively deep understanding of your own. In general, I would also like to ask you, among all the environmental training you have received, is there anything that impressed you most?

Speaker 2: It's impressive that there is training in this environment. This well just like we protect such a project of Yellow River, but also because we are on the coast of the Yellow River in Zhengzhou city, so governance of water pollution and water is very important for us, so our school will make us go to the Yellow River to pick up the rubbish, let the students as much as possible to come into contact with the Yellow River, Know why the Yellow River is called the Yellow River, it is now some of the pollution problems is what, we hold these activities, and we learn from this knowledge, told us that we should go to protect our mother river, can because protect our mother river is also benefit our human beings.

Speaker 1: OK, I get the idea. I wonder what your purpose is in doing this. What kind of problem do you think it can solve?

Speaker 2: For example, the protection of the Yellow River activities will let me know how not to waste as much as possible in the river so that our environment will have a certain impact, right, will have a good impact.

Speaker 1: I would also like to ask about your arrangement in class. As you are a Chinese teacher in the green school, I would like to have a general understanding of whether you will integrate environmental knowledge into your class.

Speaker 2: It will. Because first of all, the school has requirements in this respect so that we may integrate part of our curriculum into environmental knowledge so that students can learn some Chinese knowledge and have a deeper understanding of environmental knowledge from Chinese class.

Speaker 1: Good, do you mean that if the school requires you to do so, will you take the initiative to integrate environmental knowledge into the classroom?

Speaker 2: As I mentioned before, I majored in Chinese education, so I didn't have a deep understanding of environmental knowledge. Only when I came to the school and applied for

the green school that we had access to relevant training. Therefore, if I am personally concerned, I may not spend too much time integrating such a class into some environmental knowledge.

Speaker 1: What form do you use to integrate environmental education into your classroom?

Speaker 2: Because I am a Chinese teacher, there will be texts about environmental protection in the textbooks. I will play some documentary clips for students according to the content of the texts. Without affecting the progress of my normal teaching, I will still deliver more according to the content of the books. Because I have only learned some environmental knowledge recently, so I will only focus on my course content when the school does not require it. After all, it is challenging to teach content that has nothing to do with my subject.

Speaker 1: Well. I'd like to know more about your talking. Is there a class on environmental topics?

Speaker 2: Actually, there is no such a requirement concerning Chinese subjects.

Speaker 1: OK, I'll take notes. Thank you. I also want to know that you mentioned that you are a headteacher, right? If the teacher is in charge, will the school require the teacher in charge of each subject to explain the content of environmental knowledge in a class meeting?

Speaker 2: This school has requirements because there will be a class meeting every week. For green schools, the class meeting must present the content of environmental knowledge. But as a teacher in charge, I may go to seek some science teacher for help, and I was late to accept the training. I am afraid that some knowledge I could explain does not reach the designated position. Can the environmental knowledge of teachers in our school be for these is to know about these aspects will be more thorough, they may explain the more specific and comprehensive. Occasionally, the school will invite some other students related to the environment, that is, college students or some authoritative experts, to discuss with students to discuss some knowledge about the environment.

Speaker 1: Good Then, I get the idea. As you mentioned just now, there will be such a class meeting almost every week. That is to say. Students can learn more about such an environment and knowledge. Do you think students will respond well to such a curriculum? I mean, won't students gain environmental knowledge through such a form of teaching?

Speaker 2: This is for sure because the students in this respect or said, well, some students are very interested. Still, students lack this aspect of knowledge, so by either through the interpretation of some experts, or are we the teacher's interpretation in class, or a special to be able to hook up student's interest, and student's response is very good. I think I can use these specific examples in class. For example, some teachers will talk about how to protect the ocean in class. If you continue to discharge this white garbage into the sea, what impact will it have on Marine life? Some documentaries will also be broadcast to students to deepen their impression of the environment in such a way and start from their own to better protect the environment.

Speaker 1: OK, so I understand your basic teaching information, and I would like to ask if you have published many articles on the environment?

Speaker 2: I have never published this.

Speaker 1: OK, did you find out if there is a requirement for teachers to publish articles about the environment in each subject?

Speaker 2: This depends on the teacher's willingness. If you think that a teacher who believes his or her environmental knowledge level is relatively high and can have a better understanding and insight, they may publish an article. Yeah, it's something like this.

Speaker 1: OK, I get the idea. Have you learned about the conditions or requirements for schools to set up green schools?

Speaker 2: I also know something about this, because our school often organises some seminars for teachers. These seminars will decorate tasks and tell the teacher what to do next; the teacher should be as much as possible to attend the related training and with the students take part in some school organisation on the environment of these activities. In addition, some of the school floor space and green infrastructure is still required.

Speaker 1: OK. Are you interested in learning something about the environment?

Speaker 2: I am interested in this because I teach in a green school. So, more or less, I have to get in touch with certain environmental information, which the school also requires.

Speaker 1: Good. What kind of information do you know specifically?

Speaker 2: Generally, I pay attention to some information related to life, such as carbon emissions and energy conservation, and emission reduction, which are closely related to our life and health, so I will pay a lot of attention to some. And my car is a new energy car, so I think I may start on their own, to protect our environment, for our environment to do a meagre force.

Speaker 1: OK, that's fine. In the environmental information you have learned, are there any aspects of environmental data that make you very impressed?

Speaker 2: There are many specific things that I can't think of. Still, I have learned and been exposed to so much environmental training. I feel that this environment covers all aspects. It is not only for our life; I might have been too much to know about our life before. But now I find that forests, oceans, deforestation, umm…deforestation, and ocean conservation are crucial in our lives. So, when I see some information about destroying the environment, I still feel terrible.

Speaker 1: OK, do you think learning about the environment will impact your life?

Speaker 2: This life has had a significant influence on me. As I said, if I don't understand so much, just don't understand our current life of such an environment, these environmental problems, I will not select some way of life, energy-saving and emission reduction also won't go to choose my car of new energy. So, I think understanding this environmental knowledge is constructive for changing my lifestyle of green travel.

Speaker 1: Nice. Are you interested in taking part in such activity about environmental protection?

Speaker 2: Of course, I was very interested.

Speaker 1: What specific environmental activities will you take part in?

Speaker 2: For example, I am interested in energy conservation and emission reduction because they are closely related to our lives; I am also particularly interested in them. Therefore, this garbage and garbage treatment classification should be how it looks.

Speaker 1: So, you take part in activities held by the school more?

Speaker 2: Yes, I usually participate in activities held by the school because it is a school requirement. These activities maintained by the school can also cover all aspects of the environment that I want to know. However, my time is also limited; I may not have much time to participate in such an activity held in other places because I have been a headteacher and a teacher of the main subject.

Speaker 1: Got it. So, I would like to ask, do you think these activities will help you understand the environment? Or is there any help you will do something to protect the environment?

Speaker 2: Indeed, there is, like what I just mentioned will be helpful to my life, so I think it is good to know more information about the environment, at least let us know what kind of problems there will be in the environment we live in now.

Speaker 1: Good, I would like to have a general idea. Would you be willing to do something to protect the environment?

Speaker 2: This is for sure because I am a green schoolteacher; I must have environmental awareness to do such a thing.

Speaker 1: Okay, okay, can you be specific about what you will be doing?

Speaker 2: For example, I may start from my small things because maybe the significant aspects may not need me to do many things. Umm… For example, when I leave home, I'll conveniently give unplug my charging power supply, then because it won't let go to waste a lot of electricity. I don't want to cause a lot of light pollution, and I would choose to turn off the lights, turn off unused lights, or see people throw rubbish. I went to stop him spitting at the meeting such a behaviour…I have to stop him at the meeting, because we don't want him to contaminate our environment. I would tell him how to classify garbage as recyclable or unrecyclable. These are also based on the environmental training I learned later in school.

Speaker 1: Okay, okay, I get the idea. Would you like to share some information that you see about environmental issues and environmental knowledge?

Speaker 2: This is a once in a while because not all people would have time to go is; what I mean is that not everyone will have time to have the interest to talk about this topic, and this is a hierarchical level of higher behaviours and consciousness, so maybe many people don't involve in this aspect, so it won't be active too and others to mention these.

Speaker 1: Okay, okay, I get the idea. Do you think that learning environmental knowledge can improve your environmental attitudes and behaviours?

Speaker 2: I think it's still a little influential, because as a Chinese teacher, I always believe that knowledge can change people's awareness, and awareness can change people's behaviours. The more you know, the more you know how to do these things. This is relevant. Environmental information, you will see that you could not go to do these things to protect the environment.

Still, you also won't go to damage the background, so I think there is a relationship between them.

Speaker 1: Okay, I think you have a profound understanding of the environment. So my last question is to ask you, do you think the policies of green schools and the requirements for teachers' environmental literacy have had a positive impact after teaching in green schools for so many years? Why?

Speaker 2: That's for sure. This is for sure because, as I have said before, my undergraduate and master's primary is not environmental education. Before that, I had little knowledge of environmental information. But after teaching in this school, I find I get more interested in and want to learn about the environment, and I think doing something to protect the environment is what I should do. I am also a teacher, and I should set an example to do these things because I think these behaviours may influence my students. More importantly, as I mentioned just now, the environment is a high-level thing, so schools like green schools are still needed to let more students know that there are still many problems in the environment we live in.

Speaker 1: So you are. It's very encouraging to set up green schools, isn't it?

Speaker 2: Yes, that's for sure.

Speaker 1: Good. That's the end of this interview. Thank you very much for your participation and cooperation. Thank you.

Speaker 2: Okay, okay, see you.

NG 1 Science Teacher

Speaker 1: OK. Thank you very much for accepting the investigation of this study. Please allow me to briefly introduce the interview part of this study. This study investigates and evaluates environmental knowledge, environmental awareness, and environmental behaviours of teachers in green and non-green schools in Zhengzhou city. It is a great honour to invite you to complete our interview. Thank you.

Speaker 2: OK, OK, OK.

Speaker 1: First of all, I would like to make a brief understanding of your personal information. I would like to ask, which subject are you currently teaching?

Speaker 2: I'm currently teaching science.

Speaker 1: How long have you been teaching?

Speaker 2: I have taught science for five years.

Speaker 1: About five years. What is your educational background?

Speaker 2: My highest degree is a Master's.

Speaker 1: Then I just want to know what major you took in your undergraduate and postgraduate studies, respectively?

Speaker 2: My major is computer science.

Speaker 1: OK, did you major in computer science for your undergraduate and master's studies? OK, thank you. I was wondering, have you ever taught any other subjects before you taught science?

Speaker 2: No.

Speaker 1: You taught science after graduation, didn't you?

Speaker 2: Yes.

Speaker 1: OK, I get the idea. I wondered if you have any training related to environmental education or environmental knowledge?

Speaker 2: Not on campus.

Speaker 1: Have you ever had environmental education or training related to the environment?

Speaker 2: There will be some public welfare activities, including some of the children's palaces. It may be that some serious countries are talking about the problem of water scarcity, and then they need to transfer water from south to north. For example, in central China, Henan province is also a relatively water-deficient province. Therefore, students and society are encouraged to do an activity to save water, so it belongs to social education, including some online platforms will have such activities, lectures, I will have some understanding.

Speaker 1: These are mainly lectures and activities, right?

Speaker 2: Yes.

Speaker 1: OK, is there any special training in environmental education for teachers in your school?

Speaker 2: Almost not.

Speaker 1: What are the specific reasons?

Speaker 2: Because I think I also know that in our province is also, umm…there will be a green school and non-green school such a division of the school, is not green school, not a rigid index requirement, so they won't be active to do such a thing, also maybe the whole teaching task is heavy, so basically is rarely do such an activity.

Speaker 1: OK, I have a general idea. I will always pay attention to the information and content in this area and take part in some related public welfare activities. I think this has an impact on my life. These public welfare activities can let me learn more about environmental knowledge and the existing environmental problems and enable me to do things that protect the environment practically and feasibly.

Speaker 2: I think it is instrumental. If education is the reason, I think it can be said that there is school education and social education, especially school education, because it is a significant way for children to acquire knowledge when they grow up. If you teach environment-related expertise in school, I think it is conducive for children to develop a sense and behaviour.

Speaker 1: OK, I heard you say that environmental education is instrumental. Is there anything about the environment you have been impressed by in the public welfare activities you have participated in or the lectures you have heard?

Speaker 2: One of the things that impressed me was the fact that soil desertification was severe in Mongolia or the border areas in China. That led to many years of dust storms. I also experienced sandstorms when I was living in Beijing, and the pollution was severe. It was only after the pm2.5 was defined, and we continued to control and protect the environment that the phenomenon was improved.

Speaker 1: OK, I have a general understanding. You have a prosperous experience of environmental knowledge or environmental education. I would like to continue to know some of the arrangements of one of your classes. Because you said just now that you have a detailed understanding of green schools and non-green schools, I would like to ask, as a science teacher, will you take the initiative to integrate your environmental knowledge into the class?

Speaker 2: As a science teacher, even if the school does not require me to integrate environmental topics into my class, I will incorporate some environmental protection elements into my class, such as protecting marine life and protecting pufferfish. I will show some related documentaries in class and share my experience participating in some activities with my students.

Speaker 1: How else do you teach environmental courses? In addition to what you just mentioned, are there some novel ways students can accept more easily?

Speaker 2: Not really, because now science is one of the most critical subjects in school, and there is a lot of pressure on the whole course. However, the school will also occasionally have some activities like creative handwork. I will actively encourage students to create some novel things like lanterns by using waste. I hope they can make an innovative design or transformation with the discarded and new items around them.

Speaker 1: I'd also like to know if you think students can learn more about the environment through science courses.

Speaker 2: Actually, I feel that there will be some knowledge of environmental education in the current edition of the textbook. Therefore, students can learn the knowledge learned in books, and they will use it in daily life. I think these environmental education activities and courses are beneficial to teachers and students.

Speaker 1: OK, I see. I would like to ask you about the arrangement of your class, for example, will you take the initiative to arrange a special lecture on environmental issues? Or that the school has the requirement of this respect?

Speaker 2: this is not, because we are really at the beginning of the semester, we're going to their regular courses should be arranged, and now because of the COVID-19, sometimes will affect the progress of the class, so is the subject of course also follow up is very tight, I mean time is very close, so now there is no such an arrangement.

Speaker 1: OK. I would also like to ask whether you will take the initiative and voluntarily learn some environmental knowledge in your life or read more articles related to the environment.

Speaker 2: Actually, I still hope to expand my knowledge in this field and make some efforts. I don't read many articles, but some public welfare programs are followed by lectures,

promotions, and some public accounts. So, I will also get to know some of them. Anyway, small articles will go to understand, but not to learn professional articles.

Speaker 1: If you have such an interest, how do you improve your environmental knowledge?

Speaker 2: Actually, I think environmental knowledge and behaviours complement each other. Sometimes you see it in your life, or you are involved in it, and you want to know about it. So, I usually look up some background and learn some knowledge after seeing the related advertisement.

Speaker 1: So, you have some knowledge about green schools, but does your school plan to participate in the selection of green schools?

Speaker 2: As far as I know, there is such an idea in the school, but the size of the campus may limit it, so we are still considering improvement.

Speaker 1: OK. I also want to know more about whether you will take the initiative to participate in some environmental activities.

Speaker 2: Yes, if there are activities like Earth Hour, I will actively participate in them, including low-carbon travel.

Speaker 1: I take part in all the activities held by the school or outside the school, right?

Speaker 2: Yes, I am more active in school, outside the school on my own time, and then whenever possible.

Speaker 1: OK, do you think participating in these activities helps you understand our environment?

Speaker 2: I think so, indeed, because, in the field of environment, many people don't know this knowledge.

Speaker 1: If your school wants to participate in the selection of green schools, does it regularly hold some environmental activities for teachers or students?

Speaker 2: Because I have friends in a green school, and then I generally know the situation, Umm…they have such requirements in the green school, and then they will be more active or more frequent to hold some related activities. If we apply to be a green school, I think the school will also actively do some such preparations and activities.

Speaker 1: But there is not a very frequent activity planned for teachers and students, is there?

Speaker 2: Yes, because of the COVID-19 and the pressure of schoolwork, there is not yet a standardized teaching mode. I think if the epidemic is over, it will be better.

Speaker 1: OK. Will you take the initiative to do something to protect the environment in your daily life?

Speaker 2: Yes, I will. I think I can do everything within my power, such as reducing plastic bags, reducing straws in the future, and re-using many things, such as drinking less bottled water.

Speaker 1: OK, so what do you think is your purpose in doing all these behaviours? In other words, I want to know, what environmental problems do you think you can solve by doing these things?

Speaker 2: Take me as an example, I think the number of plastic products used is too high, and the resulting white waste, I do these things for reducing white pollution. Umm... White pollution is too severe. This is what I find pretty shocking; even in many places, you can see these plastic bags flying around. In addition, as far as I know, plastic is tough to degrade, and it may not be corrupted for hundreds of years underground, so I think this is a terrible thing. So, for us, if each of us can do, it may be to reduce the use; there is no way to say that putting an end to, or do not reduce at all, is a way to do their own, the most feasible.

Speaker 1: OK, as for yourself, will you take the initiative to share the action of protecting the environment with others, or will you share it with others?

Speaker 2: It must be close people, like family, who use more shopping bags and fewer plastic bags. And I am pleased to influence students.

Speaker 1: Yes, your awareness and behaviours of protecting the environment are outstanding. I have two final questions. Do you think that knowing more about the environment will help you do something to protect the environment?

Speaker 2: I have this idea because there are not many volunteers in Zhengzhou city at present. I plan to participate in a volunteer activity. Then I will actively assist related NGOs or government departments in doing some exercises.

Speaker 1: OK. Finally, do you think environmental knowledge can improve your environmental attitudes and behaviours?

Speaker 2: I think it will have an impact. Umm… When I know the source of the environmental problem or the hazard, I will consciously want to make changes. And the source of this knowledge can change your mind, allowing you to make judgments and cultivate some environmental behaviours.

Speaker 1: OK, I have a general understanding of your information. Thank you very much for participating in this survey. Thank you.

NG 2 Chinese Teacher

Speaker 1: First of all, thank you very much for accepting my interview for the study. I will briefly introduce the main purpose of this research. The main purpose of this study is to investigate teachers' environmental literacy, namely environmental knowledge, environmental attitudes, and environmental behaviours in green and non-green schools in Zhengzhou City. Thank you very much for sparing your precious time to cooperate with me to complete this survey.

Speaker 2: Good.

Speaker 1: First, I would like to know your background; what subject you are currently teaching?

Speaker 2: I teach Chinese at present.

Speaker 1: Okay, how long have you been teaching?

Speaker 2: The current teaching age is seven years.

Speaker 1: Seven years. Okay, thank you. What is your educational background?

Speaker 2: My highest degree is a Master's in Chinese Language and literature

Speaker 1: Have you ever taught another subject before you taught Chinese?

Speaker 2: I was a substitute teacher, an art teacher.

Speaker 1: How long was that?

Speaker 2: Because I was a substitute teacher, it was about two years. I taught Chinese and art at the same time.

Speaker 1: The same teacher teaches two subjects, one is Chinese, and one is art, right?

Speaker 2: Right.

Speaker 1: Okay, do you know anything about green school?

Speaker 2: I know a little bit about it, but maybe our green school is different from Hong Kong. For example, I understand that green schools may focus more on the on-campus environment, such as sanitation.

Speaker 1: That is not our new definition of a green school.

Speaker 2: Yeah, just to keep it clean.

Speaker 1: Okay, I get the idea. I wondered if you have received any training in environmental education or environmental knowledge?

Speaker 2: I don't have any special training now.

Speaker 1: Does the school you are in now have any special training on environmental education for teachers?

Speaker 2: Maybe there won't be training, but some activities will be organised.

Speaker 1: Can you tell me specifically what kind of activities they are?

Speaker 2: Like our school, our school will organise 1-2 activities like environmental protection every semester. This is in response to the requirements of the Education Bureau. For example, the teachers and students at the school will carry out picking activities. We will also take the students to the community to pick up trash and recycle the used newspapers.

Speaker 1: Okay, What about the schedule?

Speaker 2: About every two weeks.

Speaker 1: Okay, thank you. I have a general idea of your situation, and I would like to go over it again. Do you think it's helpful to learn about environmental education or this environment?

Speaker 2: It must be helpful because I think it is necessary in education and daily life.

Speaker 1: Can you tell me the reason in detail?

Speaker 2: Perhaps the current students are not so strong in environmental awareness, which requires us as primary school teachers to lead them to carry out some environmental protection activities to improve their understanding of environmental protection.

Speaker 1: That is to say; the teacher plays a leading role. Are there any activities or training that impressed you deeply?

Speaker 2: I don't think so. Not much.

Speaker 1: Okay, I get the idea. I want to know specifically; will you take the initiative to integrate some environmental knowledge into your class?

Speaker 2: Yes, Umm…Although the school does not have relevant requirements, because I am a Chinese teacher, there are many textbooks related to the environment, I will combine these texts and my own experience to spread relevant environmental knowledge to my students without delaying the progress of the course.

Speaker 1: Do you think students can learn more about the environment through your class?

Speaker 2: Definitely yes, because maybe they don't have as much awareness of the environment at home, including parents who may not have as much time to lead students through this kind of extracurricular work.

Speaker 1: Understand that proves your environmental awareness is still very high; there is such a consciousness to cultivate their students. In your life, I also want to know if you will take the initiative voluntarily to understand some environmental knowledge or read some environment-related content or articles?

Speaker 2: I may not deliberately watch, but if it is through that kind of network platform, similar to weibo or some software news, I can learn a lot about the environment, but I will not deliberately search.

Speaker 1: Okay, if you are interested, what ways would you like to improve your environmental knowledge?

Speaker 2: I am very interested in participating in some environmental protection activities, for example, the school's Arbor Day activities; I will also participate in some outing activities. Teachers will be very interested, but students are also very interested in these activities.

Speaker 1: I also want to ask, does your school plan to participate in selecting green schools?

Speaker 2: I think there's a plan to attend.

Speaker 1: So, does that put some pressure on the teachers or something?

Speaker 2: I don't think so. At present, we will increase some greening in the school and strengthen some tidy aspects. There is also a questionnaire survey or a simple subject assessment for students and teachers. Only those who reach a particular score are eligible to be rated as green schools.

Speaker 1: I see. It seems that your school is concerned about the green school. Will you take the initiative to participate in some activities related to environmental protection? Not only environmental protection but also some general environmental activities.

Speaker 2: I would go if the event was meaningful.

Speaker 1: What do you mean by meaningful?

Speaker 2: For example, tree-planting activities, I think, will bring an excellent aspect to the environment. But, on the other hand, some activities may be gimmicks but have no substantive effect, so we may not participate.

Speaker 1: Okay, got it. Most of the activities you participate in are held by the school, or are they more outside?

Speaker 2: I may participate in more activities organised by the school, such as planting trees, donating materials to poor areas, which can be reused, and promoting green travel in the school, such as driving fewer private cars, taking the subway, public transportation, and riding bicycles, which are all encouraged by the school.

Speaker 1: If it's you, for example, as you said, the private car, are you sure that you do it, or do you do it occasionally?

Speaker 2: Occasionally, because it's far away.

Speaker 1: I see. Do you think participating in these activities helps you learn about the environment?

Speaker 2: A little bit, because sometimes it feels like it might be better to stay close to nature.

Speaker 1: Okay, does the school hold any environmental activities regularly for teachers and students?

Speaker 2: It may not be regular, it may be occasional, it may be organised if necessary, but it will be textbook-oriented.

Speaker 1: Okay, I have a general understanding. As far as you are concerned, will you take the initiative to do something to protect the environment?

Speaker 2: I might do something simple, but I would do something like, when I go shopping, maybe there are more plastic bags now, I might use that biodegradable plastic bag or paper bag, or I might use that canvas bag by myself. Personally speaking, I am also considering changing into new energy vehicles as much as possible in the future, which may be better for the environment.

Speaker 1: What do you think is the purpose of your actions?

Speaker 2: Because everyone is advocating low-carbon travel, they do their best to protect the environment. Well. If everyone did this, it would do a lot for the environment.

Speaker 1: You must think it can solve specific problems, right?

Speaker 2: Yes, for example, the closest thing to us is the current vehicle restrictions in Zhengzhou city. For instance, if the odd-even license plate restrictions are imposed, it is evident that the sky will be much bluer, and the haze will be much less.

Speaker 1: Okay, I see. I'd like to know more about it. Do you take the initiative to share useful environmental information with people around you?

Speaker 2: This one is probably rarely shared.

Speaker 1: So why wouldn't you go specifically?

Speaker 2: Because this has to be their consciousness, others may not be willing to listen to me.

Speaker 1: Okay, I see. I have two more questions to ask you, and I would like to spare you some time. Do you think that knowing more about the environment can help you do something to protect the environment?

Speaker 2: That should help.

Speaker 1: Can you share the specific reasons?

Speaker 2: For example, suppose you want to protect the environment. In that case, I think it will be of great help to both the individual and the next generation.

Speaker 1: In other words, it will benefit future generations.

Speaker 2: This is a long-term problem, I think.

Speaker 1: Right, exactly, because you can't say you're going to see the benefits in a short period, and you have to have a certain amount of awareness, right?

Speaker 2: Yes, many enterprises are also doing low-carbon travel or low-carbon packaging, so many enterprises have begun environmental protection from the most superficial packaging.

Speaker 1: Okay, I get the idea. The last question is for you. Do you think environmental knowledge can improve your environmental awareness and behaviours?

Speaker 2: Indeed, I think including, I think it will have an impact. I know what happened before I knew what to do. If I don’t know the information, I will not be able to think of a solution to the problem, so I think it still has a certain relationship. Moreover, environmental education can indeed be of great help to the next generation. This is a matter of benefit to society.

Speaker 1: Okay, I have a specific understanding of your information. Thank you very much for cooperating with my interview and supporting my research. Thank you again.

NG 3 Science Teacher

Speaker 1: First of all, I'd like to thank you for taking time out of your busy schedule to participate in my interview. I want to give a brief introduction to my research. This study mainly focuses on teachers' environmental literacy in green and non-green schools in Zhengzhou city. This interview will last about 20 to 25 minutes. I want to express my sincere thanks for your participation. Thank you for your participation.

Speaker 2: OK.

Speaker 1: I'll get started. First of all, I would like to have a general understanding of your educational background. Then, I would like to ask which subject are you a teacher of?

Speaker 2: Science.

Speaker 1: OK, so how long have you been teaching? I mean, When did you start teaching science?

Speaker 2:98 years.

Speaker 1: What about your educational background?

Speaker 2: Undergraduate.

Speaker 1: What was your major as an undergraduate?

Speaker 2: My major was not a natural science.

Speaker 1: OK, that's OK. What's your major? Do you mind telling me?

Speaker 2: My major was literature.

Speaker 1: Is it language, literature, or another kind of literature?

Speaker 2: Language and literature.

Speaker 1: Language and literature. OK, I wondered, have you taught any other subjects before you taught environmental science?

Speaker 2: I have taught Chinese in the primary school.

Speaker 1: OK, so how long have you been teaching this Chinese subject? Because I just learned that you had been a teacher since 1998, is it possible that you have been teaching Chinese subjects for a long time?

Speaker 2: Yes, about ten years.

Speaker 1: That means that later on, they stopped teaching Chinese and became teaching natural science.

Speaker 2: Yes, because the school requires it. Moreover, there was no professional natural science teacher at that time, so I was transferred to teach this course.

Speaker 1: Got it. That is to say, because of the lack of teachers, you are transferred to natural science to be a natural science teacher. That's understandable. I want to know if you have received any training in environmental education or environmental knowledge.

Speaker 2: I didn't say I was a professional. Since the school arranged to teach this subject, since then began to contact the content of this aspect, but also while learning, while teaching, as such, I don't mean very professional.

Speaker 1: OK, I get it, so you've been trained for this kind of environment, but it doesn't mean that you volunteered to learn these things, right?

Speaker 2: That's right, because I didn't major in it initially; I started to learn and accept it in the middle of my study and then taught it in my learning process.

Speaker 1: What kind of training does it take for you to get this kind of training from your school? Is it a course, seminar, or activity? I mean, where did you learn from it?

Speaker 2: There is only one class per week.

Speaker 1: There is a scheduled class every week, isn't there? OK. Weekly class. OK, let me take notes. Thank you. So, the school will train teachers for environmental education.

Speaker 2: There is training for that. I mean the school will organise some environmental training specifically for us, mainly in teaching.

Speaker 1: Which subject will be explicitly trained, science teachers, or can all teachers attend?

Speaker 2: It's a natural science, right.

Speaker 1: OK, can you tell us specifically what kind of environmental activities are?

Speaker 2: Generally, means from the green vegetation, because of geographical location, Zhengzhou City belongs to the central plains area not as well as China's southern those well all vegetation is more let students have an intuitive to observe, on our side, there will be some means just in theory, you'll go to some of the talking to it, probably this aspect. There is also about the natural environment, such as the current automobile exhaust, which will also cause harm to the natural environment. There is no way to list them one by one, and they can be in real-life contact with some who will teach the students.

Speaker 1: OK, I got it. For this kind of environmental education training, the school will give you a weekly schedule for teachers in your school.

Speaker 2: Yes, there is only one class per week.

Speaker 1: OK. I would like to know for you, do you think it is helpful to learn this environmental education or receive this environmental training?

Speaker 2: Very necessary.

Speaker 1: So, what's the probable reason?

Speaker 2: Because with the development of society, protecting the environment has become a natural concept in everyone's mind. So, one of the things that people do in this area is they have this kind of awareness about the conservation of the natural environment.

Speaker 1: OK.

Speaker 2: So, it's necessary.

Speaker 1: That is to say, it will raise your awareness of the environment, so you are very willing to participate in some environmental education activities, right?

Speaker 2: That's right. As a science teacher, I feel that I have the responsibility and obligation to learn more information related to the environment to better educate my student.

Speaker 1: Have you found anything impressive in your environmental training?

Speaker 2: Impression. I wonder if I could interrupt.

Speaker 1: Yes.

Speaker 2: The impressive thing you pointed out is what it covers? Can you give me a hint?

Speaker 1: For example, in short, what we are concerned about now is the air quality we are living in, so for example, I would choose a way of green travel to reduce the carbon emission

in the air. Then I would like to have a general understanding of whether you have received such environmental knowledge or some activities of the environment, which can leave a deep impression on you and make you have a consciousness or behaviours to change the setting.

Speaker 2: Yes. From the point of view of daily life, we should reduce the number of motor vehicle trips as much as possible. Students will also be taught not to let their parents always drive to and from school. The government will have some professional activities to promote that to the school.

Speaker 1: OK, I get the idea, but because your background is not in environmental education or science education, are there some challenges in teaching science?

Speaker 2: Yes. Although we all have the consciousness to protect the environment, it is indeed a scientific discipline. Suppose you want to have a deeper understanding. In that case, it is not just to tell you that it is far from enough to maintain the environment in theory, but also to improve students' awareness, including the public's attention, which is to be improved.

Speaker 1: OK. Do you actively integrate environmental knowledge into your class as a science teacher? Are you interested in doing something like that?

Speaker 2: I am interested, but I still follow the relevant knowledge taught in the textbooks. If I take the initiative to integrate environmental education, I may not be able to because my environmental knowledge may need improvement. If I accumulate to a certain level, I am very interested in making the class content more vivid.

Speaker 1: OK, I get the idea, but if you are interested, have you thought about how you might teach courses related to the environment?

Speaker 2: I have thought about taking students to a natural environment and teaching them personally.

Speaker 1: OK, I see. You still want to use something like a field trip to get students to embrace nature more.

Speaker 2: Umm…

Speaker 1: Would you be interested in participating in some environmental protection activities or promoting environmental knowledge?

Speaker 2: Yes, I will attend whenever I have the opportunity and time.

Speaker 1: Well, if you have time, you will certainly go, and what kind of activities, Ummm.. if you want to go, what kind of activities do you want to do?

Speaker 2: If the government and our school holds some activities, I will attend them as a volunteer when I have time. Actually, I am very interested in participating in environmental protection activities organised by the school. I think because I am a teacher, I should lead by example to better affect students. But I may not participate in activities related to the publicity environment outside the school, because now I still need to improve myself more, and may not have time to participate in other activities.

Speaker 1: OK. Have you ever participated in any activities that you will never forget or remember deeply?

Speaker 2: I have participated in some marathons, for example. During the marathon, I would pass water to the athletes, wipe their sweat, collect the spilled beverage bottles, and help them pick up and put away the garbage.

Speaker 1: What is your purpose in doing these things?

Speaker 2: The purpose is one is, well, I consider that I am a science teacher, and I want to experience the conservation of nature by myself. Another is from my heart; I am very hopeful that no matter the environment or overthinking, everything is for the sake of that beautiful bar.

Speaker 1: OK, I see. Will the school provide some activities for teachers and students to protect the environment, or some activities related to environmental education?

Speaker 2: Schools are encouraged.

Speaker 1: Well, will there be more? Do you encourage schools to hold more activities like this?

Speaker 2: I will make some suggestions to the school.

Speaker 1: So why did you do that?

Speaker 2: The whole world is now focusing on environmental protection. As a big country, China, we cannot say that everyone can do it. We should try our best to start from ourselves and start with children so that everyone can have a good awareness of it. From childhood to the children develop a good sense, it can be conducive to some of our environmental protection.

Speaker 1: OK, I get the idea. I have two more questions for you. First, would you be interested in doing something to protect the environment?

Speaker 2: Yes. But now, it may be a feeling of wanting. But, of course, as long as I have such activities, I will still participate in them, but I may not be able to organise them by myself.

Speaker 1: I would also like to know if you could do something like this to protect the environment; what would you do?

Speaker 2: Protecting the environment is the responsibility of each of us. For example, we should encourage people to use public transportation when they travel. There is Umm than Umm… For example, this is common in life; in raising pets and walking dogs, we must timely clean up the pet faces. I will remind everyone, including those who throw garbage on the road, that I will go to persuade and stop. As a teacher, I hope that my behaviour can greatly affect my students. For example, I will tell people around me not to use wastewater resources. I will also turn off the power supply when I don’t use it and don’t litter the garbage .

Speaker 1: Good, you are very environmentally conscious. Finally, I would like to ask you a question. Do you think that learning environmental knowledge can improve your environmental attitudes and behaviours?

Speaker 2: Definitely.

Speaker 1: Can you elaborate on why?

Speaker 2: I feel that the impact is not great, because even if this awareness and behaviours do not have environmental knowledge as a pavement. However, these environmental problems

have penetrated our lives, and we know we need to do something to change our environment. In other words, we subconsciously also do something to protect the environment.

Speaker 1: In fact, you think that if you know more about the environment, it can affect your consciousness and behaviours, right?

Speaker 2: Yes, and you can teach it to people around you.

Speaker 1: That's what knowledge can change your life.

Speaker 2: Right, right.

Speaker 1: OK, now that I understand your situation, this interview is over. Thank you very much for your support of the study.

Speaker 2: OK. Thank you

NG 4 Ideology and Moral teacher

Speaker 1: First of all, thank you very much for coming to interview for my research. Please allow me to briefly introduce the purpose of this interview. My interview aims to complete my investigation and research on teachers' environmental knowledge, environmental attitudes, and environmental behaviours in green and non-green schools in Zhengzhou City. Thank you very much for sparing your precious time to support my research.

Speaker 2: Hello.

Speaker 1: Hello; let me start with a brief overview of your background, and I'll get started.

Speaker 2: OK.

Speaker 1: OK. I would like to know which subject are you currently teaching?

Speaker 2: I'm teaching moral education.

Speaker 1: OK. And how long have you been teaching morality?

Speaker 2: For five or six years.

Speaker 1:5 to 6 years. OK, OK, may I ask what your educational background is?

Speaker 2: I majored in Chinese language and literature for my undergraduate degree and philosophy for my master's degree, so I also taught Chinese before, but later, due to some school arrangements, I teach ideological and moral character now.

Speaker 1: OK, OK. So, I just want to ask you, in general, how long did you teach Chinese?

Speaker 2: I taught for four or five years.

Speaker 1: So, you teach subjects in different schools, right?

Speaker 2: Right.

Speaker 1: OK, have you ever taught in a green school before?

Speaker 2: No.

Speaker 1: OK, let me just make a note, OK, OK, I also want to ask, do you have any training in environmental education or environmental knowledge?

Speaker 2: I have not participated in any environmental training before, because I am an Ideology and Moral teacher, the school does not have relevant requirements, and I have not been exposed to these, but I think it is still advantageous.

Speaker 1: What kind of environmental training did you receive?

Speaker 2: In the form of a lecture. I've been to several lectures before.

Speaker 1: Your lecture is probably one that the school will invite some people concerned with environmental protection to give, isn't it?

Speaker 2: Yes, some professionals can share their expertise.

Speaker 1: OK, I get the idea. Is there any special training on environmental education for teachers in your school?

Speaker 2: I remember there was, but I haven't been to one, so I don't know much about it.

Speaker 1: May I ask why you are not attending?

Speaker 2: One reason is I'm busy; I just don't have time. Another reason is I am not particularly interested in this aspect. Yeah, so I didn't go.

Speaker 1: Have you had a general idea of the school's environmental courses and training schedule? For example, how often does the school schedule these activities every semester or every week?

Speaker 2: It doesn't seem to be too frequent. After all, students are busy with their studies. But, yes, as a hobby in the form of something like this.

Speaker 1: OK, OK, thank you. I would like to know again; do you think learning environmental education is helpful for your life?

Speaker 2: I think protecting the environment is also an issue of consciousness. I believe consciousness is still critical. Maybe if you have this consciousness, you will naturally have some behaviours of protecting the environment. So, you say going to study environmental education is a big help? I think it's also about people. If it can be changed consciousness, it will undoubtedly be helpful, but if it can only be one-sided to receive some knowledge, some education may not be beneficial; yes, I mean consciousness may not change very much.

Speaker 1: So, you don't think environmental knowledge has much influence on you. What matters is whether the person has such an awareness, right?

Speaker 2: Yes, indeed, environmental protection awareness is the most important.

Speaker 1: I have a general idea. I just want to have a basic understanding of some information in your regular class. Will you take the initiative to integrate environmental knowledge into your course when you are in the category?

Speaker 2: No. Because I teach ideology and morality, a liberal arts subject, it is challenging to introduce environmental education and environmental protection knowledge. Yeah, so I didn't try it.

Speaker 1: OK, OK, I would like to ask, are you interested in learning about environmental knowledge?

Speaker 2: Actually, I'm kind of interested. Yeah, but I didn't have the time, so I didn't study formally.

Speaker 1: The point is that there is no time, and because you are engaged in a profession of moral character, there is no actual use.

Speaker 2: I think maybe science teachers have more to accept.

Speaker 1: If you were interested in learning about it, how would you probably know about it?

Speaker 2: I think if the school holds some lectures, or it has some related courses, which are free, maybe we will listen to them, after all, we can share them with others.

Speaker 1: Does it mean that the school will do it if required to do so? Isn't it?

Speaker 2: Yes, that's certainly OK.

Speaker 1: OK, I would also like to know whether you are interested in participating in more environmental protection activities or promoting environmental knowledge?

Speaker 2: I'll see. If there is an opportunity, I can go and have a taste of it.

Speaker 1: If you are interested, what kind of activities would you like to participate in?

Speaker 2: I think I can take part in some outdoor activities. Maybe we can see the protection of some rivers to understand how rivers can be protected. We can go to the place and learn the related knowledge, which I think will be more vivid.

Speaker 1: OK, have you ever been to anything like this before?

Speaker 2: I don't, but I know there is. Yeah, I just didn't show up.

Speaker 1: Do your schools offer special activities like environmental protection for teachers and students?

Speaker 2: There will be.

Speaker 1: Specifically, do you think they will significantly profit after participating in these activities?

Speaker 2: I think students are pretty willing to participate in this kind of activity because it is more exciting and may be different from our textbooks. They will be curious about new things.

Speaker 1: Would you encourage schools to hold more similar environmental activities?

Speaker 2: Yes, yes, I think it's good because it can also have a positive impact on students' awareness of environmental protection.

Speaker 1: OK. If it is your own, will you be interested in or take the initiative to do something to protect the environment?

Speaker 2: I can do what I can. For example, I can sort out the garbage at home and throw it away. I can support garbage sorting and recycling. The simplest is to turn off the lights and turn off the faucet. I also remind people around me not to waste water resources because we all know that some resources are not renewable. So I still have these simple environmental attitudes.

Speaker 1: What do you think is your primary purpose in doing these things? For example, you mentioned garbage sorting and recycling just now. What environmental problems can it solve?

Speaker 2: I think the effective sorting and recycling of waste is good for the environment, because in the relevant places, they have less pressure to deal with these things, and they won't throw away some rubbish in some areas that shouldn't be, which will be good for some living things.

Speaker 1: OK, thank you. I have one last question for you. Do you think that knowing environmental knowledge can improve your environmental awareness and your behaviours of protecting the environment?

Speaker 2: I think so.

Speaker 1: Can you tell us the reason? In your understanding, why do you think environmental knowledge can improve your awareness and behaviours?

Speaker 2: Well, because I don't know it very well. Umm… I feel that it may have a certain impact. Maybe the more a person knows, the more he may change his awareness and behaviours, whether environmental or other aspects.

I feel like I'm contributing to the environment in the end. So I think awareness is fundamental; you know more can promote your awareness.

Speaker 1: Well, that's fine. Thank you very much for accepting this interview, and I would like to express my heartfelt thanks for your participation. So that's the end of our interview.

Speaker 2: OK, thank you.

*Speaker 1: Interviewer

** Speaker 2: Interviewee

Interview Transcript for Chinese Edition

中文版本

G1 科學教師

*講話人 1：首先我先介紹一下，本研究主要是針對鄭州市綠色學校和非綠色學校的老師進行的關於環境知識，環境態度和環境行為的環境素養方面的調查研究，非常榮幸能邀請到您來做我們本次調查的採訪嘉賓。本次採訪時長大概在 20 到 25 分鐘左右，再次感謝您抽出寶貴的時間來進行本次的採訪。我們現在就開始了。如果中途信號不好，或者說是有什麼其他的問題，您都可以對我進行提問，謝謝。首先，我想問您一下，您目前來說是哪一門學科的老師？

**講話人 2：自然科學。

講話人 1：您大概的教齡是多長時間？

講話人 2：93 年開始，20 多年。

講話人 1：好的，那您目前來說學歷背景是什麼樣的？

講話人 2：大學本科。大學本科生物系的。

講話人 1：好的，也就是說您的學科和自然科學是有很大的關係。那您在教授自然科學之前，有沒有教授過其他的科目？

講話人 2：在教授自然科學的同時，也教授一些有關於生物、動物等等與自然科學有關係的一些學科。

講話人 1：那大概教了多長時間？

講話人 2：從自然科學分出來之前也有幾年時間。

講話人 1：好的，也就是說它其實還是歸結於自然科學裡面的一個方向，是嗎？

講話人 2：對，過去最早的時候它叫自然，這裡面就包括了很多關於生物、化學、物理方面的一些知識，這是最近這幾年之後把它獨立的分出來了，叫做自然科學這樣一門科學學科。所目前就按照教科書上界定的一些範圍進行授課。

講話人 1：好的，那我大概瞭解了。請問您是什麼時候來這所學校來任教的？

講話人 2：93 年吧，93 年大學畢業分配到這的。

講話人 1：好，那您知道您所在的學校是 18 年才變成的綠色學校，所以在這之前，您是經歷過學校怎樣從一個非綠色學校變成綠色學校的過程，是嗎？

講話人 2：從我這兒瞭解到的情況大致是這樣的，從總的方向上來說，隨著中國經濟的不斷的發展，加上提出了生態文明建設這樣的一個總體目標，整個中國大陸對於環

境保護方面越來越重視，在這樣的大背景之下，我記得不是很清楚了，可能就在 2015 年前後，教育局下發了這個文件，提出了在鄭州市範圍之內的評選綠色學校的這樣的一個要求。隨著驗證下發文件中有關於綠色學校的標準，甚至於評分細則都頒布了，頒布了以後，我們就各個學校就照著這樣的一個標準去執行，去做。在做的過程當中，教育局就下發文件，要評比出市級，省級綠色學校。這樣情況之下，各個學校就寫了一些自己在工作中的一些做法，寫成報告上報教育局。教育局就分配了評價督導組，到各個學校去檢查、評價，並按照評分的細則進行評分。評完以後，上報鄭州市教育局，在這樣的整個前提之下，評選出了一些鄭州市的綠色學校。我的瞭解大致就是這樣。

講話人 1：您對這個綠色學校的瞭解還是非常全面的，我想問一下，您目前來說是不是一個班級的班主任老師？

講話人 2：目前不是。

講話人 1：好的，我大概對您的背景有一定的瞭解了，在您的教育背景中，有沒有接受過環境教育或者是和環境教育相關的培訓？

講話人 2：他是這樣的，自然科學老師按照我的學歷背景，我在學習這個生物學的時候，其中就有一門課就是環境科學、自然科學這方面有這樣分支，所以說我就曾經，當然是早幾年曾經系統的接受過自然科學這樣的一個教育。隨著參加工作以後，教育局每學期尤其是暑期都要組織各個學科的教師分別到不同的大專院校去接受與本學科相關的一個系統的，也可以稱作，繼續教育這樣的一個培訓。所以說我也多次參加過有關自然科學方面的一個培訓。

講話人 1：這個培訓大概是什麼樣的一種授課形式？比如說，可能是課程或者是一些研討會，還是舉辦的一些活動？

講話人 2：這都包括，既包括課，也包括講座，也包括一些研討會都有。

講話人 1：因為您所在的學校是綠色學校，學校是不是也會專門舉辦一些有關環境教育的相關培訓？

講話人 2：也有，為了體現自己是綠色學校這樣的一個特點。因為在每一學年的教育教學過程當中，都會有不同的兄弟學校來到我們學校來進行參觀和學習，就看你在綠色學校建設方面有哪些值得學習的地方。學校對這一塊也非常的重視，所以說也會定期進行相關的培訓。

講話人 1：大概這個時間是怎麼安排的？就比如說每個學期，還是說每個月或者每一周他都會有這麼 1 次到 2 次的環境教育培訓安排呢？

講話人 2：如果是教研組內部的正常的教研，每周都有，在學校這樣這個大的背景之下，一般一個月、兩個月會進行一次的。

講話人 1：好的。那具體的環境活動一般都是哪一類的？是比如說是環境保護，還是說宣傳環境教育還是說還會有其他的？

講話人 2：這裡面就多了，你比如說有的時候會聘請專家進行講座。另外也會搞一些活動搞一學校也會組織學生與相關部門進行有關於保護黃河等等一些方面的教育。

講話人 1：好的，我大概瞭解了，請問您覺得就這些活動也好，或者是接受環境教育，對您的生活上面有沒有很大的幫助，或者說你覺得它有用嗎？

講話人 2：我覺得非常的有用。這樣不僅說是對教師個人的素質、專業素質有了進一步的提升，也對學生環境保護的意識有了進一步的提高。環境保護意識的提高我覺得非常的非常的重要。因為，畢竟在中國經濟發展的大背景之下，早些年人們不重視環境保護，所以說就造成了經濟雖然發展了，但是環境破壞、污染都非常的嚴重。而當時，學生環保的意識整體不高。所以說，我覺得通過一些活動提高人們的環境保護意識，為我們提高整個社會的環境保護意識顯得尤為的重要。

講話人 1：好的。那請問在您接受過的環境教育或者瞭解過的環境知識方面，有沒有讓您覺得印象比較深刻的內容，或者是有沒有印象深刻的一些活動？

講話人 2：比如說我還是說到剛才黃河保護活動，談到黃河的污染問題，早些年有一些黃河的支流也好、乾流也好，受到不同程度的污染，使得人們飲用水發生了困難。所以說這樣就顯得提高人們的環境保護意識，採取一些環境保護的措施顯得極為的迫切。據我們所瞭解，現在相關部門正在制定黃河保護法，準備用法律的方式強制保護黃河。所以這樣呢，我們在法律沒有出台之前，我們也加強對學生有關於河流、水質污染方面知識的培養。目的只有一個，還是在於提高學生的環境保護的意識。

講話人 1：好的。我就想再對您進行一個比較細緻一點的瞭解，您會不會在您的課堂上融入有關環境知識的內容？您是自願要做這樣的事情，還是說學校必須要求您要把環境知識融入到課堂當中？

講話人 2：這裡分兩個階段，早些年的時候，我或者這樣講，在沒有進行綠色學校評比之前，我們教的是自然學科。在自然學科中，包括了動物、植物，當然了也涉及到環境保護一方面的知識。所以說我們在日常的教育教學過程當中，可以說是自覺不自覺的就將環境保護教育內容融入到了日常的教育、教學課程當中。學校成為綠色學校以後，一方面是我們有這樣的自覺的行動，另外一方面我們加強有關於環境保護意識方面的一些教育。

講話人 1：好的。在您的瞭解下，學校有沒有必須要求每一門學科的老師都要把環境教育融入到課堂當中。

講話人 2：這是很自然的，因為你畢竟在學校進行綠色學校評比過程當中，已經對所有老師加強了有關於環境保護意識方面的教育。所以說對於我們學校來講，整個教師在環境保護意識方面、整體的環境素質相在鄭州市還算是比較高的。在這樣的前提之

下，包括各個學科的老師們，它在教育教學過程當中會不斷的抓住任何的體系，進行有關於環境保護知識方面的教育。

講話人 1：學生們對這種授課方式的反應會不會比較好？更容易接受一些環境知識呢？

講話人 2：這還是分兩個階段，畢竟以前是生硬的課堂教學，而現在就好得多了。不僅是多媒體的應用，再加上各種各樣的拓展訓練，還有我剛才提到的你要去保護黃河，有的時候也會去黃河遊覽區撿拾垃圾、進行宣傳教育，提高人們愛護黃河的意識等等。多種活動結合在一起，學生們非常的喜歡，他們也樂意參加這些活動。

講話人 1：就像您剛才提到的這些活動，它具體是學校要求這麼做，還是說每個老師都會自己有意識要去做這樣的事情。

講話人 2：兩方面都有，學校也提出了具體的要求，在這種要求之下，老師們集思廣益、各想各的高招。各自利用自己所掌握的資源，開展豐富多彩的環境保護活動。

講話人 1：好的。據我瞭解，關於綠色學校方面他還會要求老師們多發表一些關於環境方面的文章，請問您有沒有發過關於環境方面的文章呢？

講話人 2：有，但是不多。我這裡的原因主要是在於發表這樣的刊物目前不是太多，所以說寫出來之後也沒有地方發表，或者說找一個發表的地方很難。

講話人 1：那如果你有發表的話，具體是在哪個地方，比如說是校報、學校的期刊還是說？都有。

講話人 2：校報上有，但是還有學校自己的網站啊自己的網站。另外大家更想為了評職稱的需要，大家更想在類似於自科學這樣的是國家級的刊物上。

講話人 1：ok，就是如果學校有這方面的要求，他有沒有具體要求哪一門學科的老師必須去發表這樣的文章？

講話人 2：類似於這樣的要求不多，但是為了教師個人自己的發展，他會自願的完成一些在相關刊物上發表文章的一個任務。

講話人 1：他們這些文章會不會代表學校去參加比賽？就比如說綠色學校之間評比的一些比賽。

講話人 2：那有。這個文章在某個刊物上獲獎之後，會參加比賽。

講話人 1：好的，我瞭解了，那針對您自己，您會主動去參加一些環境的活動嗎？

講話人 2：那肯定會的，就在剛才咱們講的那些過程當中，一方面學校的要求，另外還有社會的需求，我們學校經常也跟社區一塊兒搞一些環保方面的活動，所以說這已經成為我們師生每個人自覺的一種行動。

講話人 1：您參加的這些活動對您的生活會產生一種怎樣的影響？

講話人 2：對我個人的生活來講，我感到我個人的環境保護意識在不斷的提升，在自己的日常生活過程當中，會自己意識到某一個行為會危害到環境，所以我肯定不會去做。

講話人 1：也就是說您會主動的去做一些想要保護環境的事情，對嗎？有沒有什麼具體的例子？就比如說，想要選擇綠色出行來減少碳排放量，會不會有一些具體的例子？

講話人 2：有。你比如說拿我們家自己來講，我們家的汽車經常是不開的。我們家人出行都是乘坐地鐵、公交等等交通工具用。

講話人 1：好，那您覺得您做這些事情，就是您的這些保護環境的行為具體的目的是什麼？他可能會解決一些什麼樣的環境問題呢？

講話人 2：這樣做就是剛才您那邊講到的，減少碳的排放，極大程度避免溫室效應。

講話人 1：那您覺得環境知識的高低，就是您自己個人的環境知識高低是否能夠影響到自身的一個環境意識和自己的保護環境的一個行為。

講話人 2：我覺得那是肯定的，如果你系接受過有關於環境保護方面的教育，你從思想的深處就會深深的烙上環境保護非常重要的烙印。你如果不接受相應的教育，在整個思想境界上它達不到這樣的一個高度，因此某些行為它就變得是很被動，更不能改變自己的態度和行為。

講話人 1：所以您認為學習環境知識還是可以和您的環境意識、和行為有一定的關係？

講話人 2：那是肯定的，並且關係非常的大。

講話人 1：我想最後問您一下，在您在綠色學校任教這麼多年來，您覺得綠色學校的發展政策和標準會不會對老師的環境素養有一定的積極影響？

講話人 2：我個人的理解是有積極的影響，隨著整個鄭州市綠色學校的評比的深入開展，他不僅不光是評一次就完了，各個學校會按照不同級別的綠色學校的評比，會更加明確自己在綠色教育方面、環境保護意識方面的發展。

講話人 1：所以您是鼓勵綠色學校項目在鄭州市大力發展，對嗎？

講話人 2：對。不僅是我們這個學科，不僅是我們這個學校，現在是越來越多的人都意識到了發展綠色學校對於開展環境保護教育意義的重要性。

講話人 1：好的，我對您的情況有所瞭解了，非常感謝您能配合我完本次訪談，本次的採訪也就到此結束了，非常感謝您的參加，謝謝。

講話人 2：謝謝。

G2 英文教師

講話人 1：我先大概做一個介紹，我目前在做一個研究，我們的研究主題是對鄭州市的綠色學校和非綠色學校關於老師的環境知識，環境態度和環境行為的環境素養的一個調查研究。非常榮幸能請到您來當我們的採訪嘉賓。我就正式開始我們的問題，也就不耽誤您的時間，因為我也知道您平常教書是挺忙的。

講話人 2：好的。

講話人 1：可能網絡信號會有一點差，但是如果聽不清楚，您可以告訴我。

講話人 2：好的，明白，沒問題。

講話人 1：我想問一下，您目前教授的科目是哪一科？

講話人 2：英文。

講話人 1：那您大概教齡是多長時間？

講話人 2：那你。

講話人 1：好的，我想大概瞭解一下，您目前的最高學歷是什麼？

講話人 2：本科，就是我本科是英語教育專業。

講話人 1：您在教授這個英文科目之前，有沒有在其他的學校教授過別的科目？

講話人 2：沒有的，一直都是在教英文。

講話人 1：好的，您大概是什麼時候來綠色學校任教的？

講話人 2：我想一下，大概是 2016 年的時候。

講話人 1：也就是說您在來這個學校任教之前，您的學校還並不是綠色學校，是嗎？

講話人 2：是的。

講話人 1：好的。我想再大概瞭解一下，您雖然沒有接受過環境教育的這樣的一個背景的學習，但是你有沒有接受過和環境教育有關的培訓呢？

講話人 2：是，我來了咱們綠色學校之後，是有參加過相關的培訓的。因為學校是每年對於領導還有班主任都需要進行一個定期的培訓，所以我後邊作為班主任的時候進行了培訓，其他老師也可以自願參加，因為我比較有興趣，所以基本上類似的培訓我只要有時間都有參加。

講話人 1：好的，我大概瞭解了，那您參加的這個相關的培訓是一個怎樣的一個形式呢？我的意思是，他是像課程一樣，還是說會舉辦一些活動讓老師們去參加？

講話人 2：基本上都是以環保培訓授課的形式開展的，學校會從外邊請一些專家或者相關的這種比較有經驗的老師來進行講課，或者說是經驗的分享，以及跟我們的校內老師的一個共同的探討，所以都是以這種形式的會比較多。

講話人 1：好，那這個時間方面，學校是會定期舉辦這樣的相關培訓嗎？是有這樣的一種政策的要求，是嗎？

講話人 2：對，因為據我瞭解就綠色學校本身來講，是要有這樣的一個環保培訓的，我們學校也是積極的響應這樣的一個政策要求，所以每年每學期都會開展這樣的活動，在學期初的時候都會有這樣的、定期的一個環保培訓。

講話人 1：那大概的次數是幾次？是每學期定期舉辦一次，或者說是每學期會定期舉辦很多次嗎？

講話人 2：平均下來應該是每學期兩次，大概 1 年 4 次這樣子。

講話人 1：那個頻率還是挺高的。

講話人 2：對的。

講話人 1：好的，我想再瞭解一下，您覺得您接受的這些環境教育對您是否有很大的幫助？或者說是對您的生活上是不是覺得他很有用？

講話人 2：是的，因為我為什麼從最開始參加，就到後面都一直想參加，我覺得他講的這個知識不光是對於我授課去傳授相關的知識、給我自己的學生有用處，而且覺得也是跟我生活也是息息相關的。因為對於我之前的專業來講，我對這些方面多少還有一點知識的盲區。現在因為大家對環境的關注，也讓我產生了興趣，對這個知識的獲得讓我有了更深的認知，也覺得自己應該行動起來，所以對我來說還是影響挺大的。

講話人 1：既然您說了，對您的生活方面還是非常有用的，有沒有哪一些記憶深刻的環境的主題或者內容是讓你覺得他對你的生活是非常有用的，息息相關的？

講話人 2：其實就是最直白，最深刻的，每一個都對我來說很有用。但是最相關的的話，我就覺得目前全國都在做的減塑，就是減少塑料袋的應用的活動，因為這個是最開始讓我深刻感覺到跟我們息息相關，是因為參與了一個海洋污染專題講座，我就看到了很多海洋生物，比如說，海龜、海鳥，就是因為我們所亂丟棄的塑料垃圾，被他們誤食之後，他們就會慘死掉。而且這類事件的比例在每年逐漸的遞增，讓我覺得觸目驚心，覺得我們的確是破壞了環境，而且我們減塑是勢在必行。所以我從自身來講，就會減少塑料袋的使用，平時也會潛移默化的教育學生來做這樣的一個，嗯，就是環保的一個行為。

講話人 1：所以您還是挺鼓勵學校多開展這樣的相關的培訓的，對嗎？

講話人 2：對，因為確實這些前沿性的東西會給我們不同的認識，所以我覺得是有必要的。

講話人 1：好的，據我瞭解，您在您的課堂上會不會去融入一些跟環境知識相關的內容?

講話人 2：在我的課堂上，因為你也知道我教的是英文專業，所以其實在就傳統的授課中講融入不是特別容易。所以我就會會根據假如說這一期的是風能什麼的，根據這些主題找一些有趣的課外閱讀。通過課外閱讀的形式來引發大家的一個分析和討論，進而教導他們應該怎麼樣去保護環境，也看看他們自己是不是有這樣意識來做這樣的事。

講話人 1：那也就是說您是個人意願，比較想要讓學生去瞭解更多的環境知識。

講話人 2：對的，我覺得其實像我們只能是以身作則，但是孩子還是在成長階段，他們的意識對於未來的影響是很大的。

講話人 1：那綠色學校就這一方面而言，他們會不會有一些相關的要求？比如說你這學期這門課上必須有多長時間是要融入環境教育的?

講話人 2：這個是沒有硬性的要求的，因為就是不同的學科，或者你跟根據你不同的進程來講，這樣做難度很大，但是學校會鼓勵老師這樣做，所以在我們每次學期初的我們培訓或者研討會的時候，學校就會提到這一點，去鼓勵老師用一些創新性的、發散性的思維來進行融入。所以就沒有說硬性的規定你要在哪個時段去融入，但是會鼓勵你做這樣的事情。

講話人 1：在看學生的一個反應，就是學生他對這樣課程的安排會不會有一個很好的反應，或者說是他們的反應是什麼樣的？會不會能夠收穫到一定程度的環境知識?

hello，現在能聽見嗎？學生對您的授課會有一個怎麼樣的反應？我的意思是他們會不會獲得一些更多的環境知識?

講話人 2：我覺得就說其實這樣的一種設計。課程的設計，主要在於老師根據自己學生的一個就是理解的狀況和自己學生的一個喜好，進行一個有趣的設計之後讓學生有參與感的時候，他們的反饋都是非常好的。他們在這個過程中還會自己積極的思考，在積極的思考了之後，他們進行討論的時候就會很自然的去說出很多他們對於環境的一個認識，以及他們以後應該怎麼做。就像我也給他們看那些海龜，因為吃了塑料袋而死去的，他們會覺得很傷心，就會覺得我一定不會再亂丟垃圾，我一定會減少塑料袋的使用等等。所以我覺得對他們來說是非常的有作用的。孩子們會就是逐漸的、潛移默化的樹立起這樣一個環保的意識。

講話人 1：好的，非常感謝您對環境保護方面做出的一些貢獻。我想繼續瞭解一下您有沒有發表過關於環境方面的一些文章，不是論文一類的，相當於您自己的一些言論可能對環境很有幫助，會不會在那些校報或者是公眾可以看到的那些類似大河報、很出名的那些雜誌上發表一些這樣的言論。

講話人 2：就我本人來講，因為我是英文專業的，學校每次的這種校刊，包括學校的宣傳欄里，我會積極的去寫一些像教學的心得，還有一些本學期的一個，嗯..學生所做

到的一些事情，包括學生一些創意的廢物利用做的一些手工、設計，之後進行一個相關的描述和文章的輸出。但是我就沒有在像大河報這樣，我沒有去發表，但是我知道我們學校有專門的老師是科學類的，對這些更有深入瞭解的老師會定期的去做一些這樣的投稿，也會把我們學校目前的成果進行一個很好的展示。

講話人 1：那您的這些學校校刊、期刊或者是這些校報，會不會被要求拿去參加一些評選或者是讓更多的人知道？

講話人 2：需要看他就是呃你寫的這個會很有影響力，之後也會有，但是看一下會不會符合當今的一個具體的主題。

講話人 1：我大概瞭解了，您是自願參加的還是說學校要求您這樣做的？好像對方網絡連線又不太穩定。hello。hello。您是否會對學校申請綠色學校的一些條件有所瞭解？

講話人 2：有的，因為我們作為班主任需要去瞭解這樣的一個條件，是有助於自己課程的安排，也有助於說怎麼樣去讓學校每次都達標，做出一份努力。

講話人 1：您大概瞭解到的是哪些條件？

講話人 2：條件一般我覺得就真正來講，它會對一個基礎設施建設就是環境的基礎設施建設，包括像綠化、什麼、設備，以及學校的衛生狀況，就看看有沒有什麼污染這些。是一個方面，對於老師的、學校領導，可能在行政管理方面也是有對他們要求，可能需要他們進行準備資料，之後進行一些教育還有對我們老師來講，就會給我們進行培訓，需要我們進行課堂融入。學校也會舉行一些專題活動，就像假如說是利用這個塑料瓶進行一些創意手工等等的，以及一些其他的實踐活動，像學生可以自己去參與一些呃學校組織的一些綠化、美化、回收這樣的一個。

講話人 1：好，學校要做的這些東西還是挺全面的。

講話人 2：學校會有這樣的一個計劃，然後會傳達過來。但是這個其實每一步就滲透下來，其實還是挺自覺的就融入進來了，還沒有那麼大壓力。

講話人 1：那您覺得您瞭解這些更多的環境方面的信息，或者是參加那麼多環境方面的活動，會不會幫助你更想去做一些保護環境的事情？

講話人 2：這是一定的，因為我們之所以感興趣，當然不是對這個理論感興趣，而是覺得他跟我們息息相關。之後我們其實就應該關注我們為什麼會全球變暖，為什麼會排放了那麼多的二氧化碳導致了環境的變化。像之前北京的 pm2.5 這樣的各種能跟我們生活連在一起的這些問題，讓我覺得確實可以把環境知識結合起來，讓我自己有所行動。也希望我們的學生通過這樣的學習後來進行相應的一個環保的行動。

講話人 1：比如說你會做一些什麼樣的事情，再具體一點。就類似於如果您瞭解到碳排放量可能會對我們生活的環境有很大的影響，您會不會減少一些碳排放量做一些減少碳排放量的活動，比如說選擇綠色出行等等這樣的方式，就類似於這樣的一些事情您有沒有具體的去做過哪些？

講話人 2：其實我覺得我自身做的比較多的就是說回收，就把這些像塑料瓶，其實是應該是最開始要自己以身作則減少使用量，就盡量的去減少這樣的一種使用，之後盡量的不去呃過多的去消耗塑料的製品。之後下一步主要是有可能前面就進行一個回收利用，會把它去收集起來，之後包括紙皮這些東西都希望它可以沒有變成垃圾，而是變成一個循環再造的一個過程。所以這個是我生活中做的比較多的，綠色出行的這一塊我也會關注，但是因為像鄭州四季分明，所以在春秋這個季節，我一般都會選擇一個像單車這樣的出行方式，盡量的減少這樣的一個碳的排放。

講話人 1：那您這樣做的目的就是減少空氣的污染。然後也會盡一切可能的、盡一份力去保護我們的環境。所以說您做這些事情還是說是很有意義的，是嗎?

講話人 2：對，我覺得其實就是說我一個人其實可能看不到怎麼樣的改變，但是因為我們作為教育工作者，會把信息傳達給更多的孩子，孩子也會去影響身邊的人，這個作用是更大的。

講話人 1：很好，我還想瞭解一下，您會主動的去參加一些類似於環境保護的活動嗎?

講話人 2：一些如果要是說非學校的一些其實比較怎麼說呢就是比較學術性的研討會，我是不會參加的。但是一些活動像那些 1 小時這樣的活動，我肯定是會參加的，我會成為一份子的。

講話人 1：好的，我還想最後問一個問題您認為您環境知識的高低是否能夠影響到您的環境意識以及您的環境行為?

講話人 2：我覺得是完全會的，因為從我自身以及我教授孩子這多年的經驗表明，很多事情是我們知道了之後，我們才會去知道怎麼做的。就像是我們從之前不知道這個塑料，我們丟的一個塑料袋就會可能帶來一個海龜的死亡一樣。我們知道了這件事了之後，我們就會從自身來做起，我們也會意識到這個東西是跟環保有關的，需要有這樣的責任感。所以我覺得這個環境知識會帶給我們一個環境意識很大的變化。

講話人 1：所以我還想問一下，您對學校目前綠色學校方面的這些政策或者是一些條件，還是覺得他對您對環境的認知是有所幫助的，是嗎?

講話人 2：現在是的，這個確實有幫助。

講話人 1：好的，非常感謝您的回答，也非常感謝您對本研究的一個支持。我們的採訪就到這裡結束了，謝謝您，最後還是要非常感謝您百忙之中抽出時間來回答我的問題。

講話人 2：好的，拜拜。

G3 數學教師

講話人 1：非常感謝您能夠來參與我們本次研究的一個採訪部分的內容。首先允許我對研究內容做一個簡單的介紹，本研究主要是針對鄭州的綠色學校和非綠色學校關於老師環境素養的一個研究。特別感謝您能抽出寶貴的時間來配合我的研究，謝謝。

講話人 2：好的。

講話人 1：我就簡要先問您幾個關於您的這個背景的一些問題。我想問一下您目前是哪一門學科的老師？

講話人 2：我目前所教的學科是數學。

講話人 1：數學是吧？那您大概教數學教了多長時間？

講話人 2：我現在教齡有大概 *9* 年。

講話人 1：那您的學歷背景是什麼呢？

講話人 2：我最高學歷是研究生，碩士研究生。

講話人 1：好的，那您的專業是什麼？

講話人 2：我的專業就是數學。

講話人 1：就是數學教育是嗎？

講話人 2：數學教育。對。

講話人 1：好的。

講話人 2：我還有一個本科學的是心理學。

講話人 1：本科是心理學。好的，您涉獵還挺廣的，請問您之前有沒有教過其他的科目？

講話人 2：目前沒有。

講話人 1：一直以來這 *9* 年的教齡期間只教了數學這一門課，是嗎？

講話人 2：對。

講話人 1：好的，我想問一下，您是什麼時候來綠色學校任教的？

講話人 2：我畢業就過來了。

講話人 1：那也就是說差不多也就是大概是 *201516* 年左右，是嗎？

講話人 2：*13* 年應該。*201213* 年左右。

講話人 1：好的，那也就是您經歷了學校從非綠色學校變成綠色學校的一個變化，是嗎？

講話人 2：對，我們學校是 *16* 年申請到綠色學校的。

講話人 1：好的，您對這個變化有什麼看法嗎?

講話人 2：首先我作為班主任老師，覺得綠色學校肯定是以後的一個趨勢。

講話人 1：好的。

講話人 2：但是從教學角度來講，我認為有點兒呃不是太有必要。

講話人 1：我明白，也就是說是在你經歷這個變化當中，其實還是以學校的要求為主的，是嗎?

講話人 2：對，我是以學校要求為主的。

講話人 1：好的，我方便問您一下，您有接受過和環境教育或者是環境知識相關的培訓嗎?

講話人 2：我們學校會組織。

講話人 1：也就是說除了學校組織的以外，基本上是沒有參加過其他的培訓，是嗎?

您的這種培訓是以怎麼樣的形式進行的?

講話人 2：我們學校會利用教師的那種課余時間，例如寒暑假，或者是利用假期，比如 *10.1* 假期，會抽出一天，我們有時候會開教研會，教研會的期間我們會進行一些，學校會組織一些活動，就給教師培訓關於如何教導學生進行那種環保意識之類的這種教育。

講話人 1：明白了。也就是他的這個形式主要是以一個研討會的形式，大家一起坐下來研討一下，看看有沒有什麼自己的想法，是嗎?

講話人 2：是的。

講話人 1：我想大概再瞭解一下學校是會專門兒舉辦這樣的一些關於環境教育的相關培訓，是嗎?

講話人 2：對，我們會組織一些培訓。

講話人 1：具體它會是哪一類的這樣的一種培訓呢?

講話人 2：你像我們就是一般我們學校可能會比較傳統一些，我們還是以教育局下發的文件為主。我們會針對這些文件，比如說這次的文件可能會涉及到一些學校的環境保護，還有學校的這種儀容、儀表、整潔方面比較在意這些。

講話人 1：是針對一些綠色學校給出的一些方案、方針，然後去設計的一些活動，是嗎?

講話人 2：對，你像我們像節水、節約糧食、垃圾分類這些方面我們會比較注重一點。

講話人 1：好的。

講話人 2：包括像我們的電器都也換成了那種可那個那個低能耗的那種。

講話人 1：好的。就像類似於這樣的培訓學校是怎麼樣安排這個時間的?

講話人 2：培訓我們就跟剛剛說的一樣，我們會利用老師放假的時間，學生都已經放假了時間。

講話人 1：也就是寒暑假是嗎?

講話人 2：寒暑假，包括一些假期我們老師會安排值班，值班的時候可能會叫大家一起來開個會，商討一下近期的結果，或者是每個班彙報一下各個班級的情況。

講話人 1：也就是說絕對不會打擾到平常的正常授課的時間。

講話人 2：對，我們不會利用那種正常上課時間去進行這個培訓。

講話人 1：好的，那這個要求是老師必須都要去參加，是嗎?

講話人 2：對，我們要求是班主任以上都要參加。

講話人 1：好的，我大概瞭解了，請問您覺得學習這個環境教育它有用嗎？您接受的這些環境相關的培訓有用嗎?

講話人 2：我覺得對老師來講其實作用不是很大，因為這個東西感覺是教育局硬性規定的一種手段，但是其實在日常生活中，我們也不可能完全按照這個走，我們只是為了，嗯，說難聽點，就是應付一下教育局。

講話人 1：我明白了，也就是說強制性要求要這麼做。

講話人 2：對，我們是強制性要求的，而且像有些情況下，你像我個人認為，像校園，他也是會消耗大家很多時間，或者是消耗大家時間，包括你像打掃校園肯定會利用到水之類的。我其實覺得這並不是一個很環保的一個規定，但是他又要求學校必須要有一定程度的整潔。就像衛生程度肯定是要費很多水、人力、物力，我覺得這反倒是很消耗資源。也就是說達不到他想要的一種就是提倡綠色的這樣的一種要求。

講話人 1：好，我大概明白了，有沒有可能有的老師會覺得環境教育沒有用，是因為對環境教育的理解不夠深入?

講話人 2：我覺得不是對環境教育理解不夠深入，是我覺得現在這個政策問題，我們作為老師可能不是很樂於去接受。

講話人 1：明白，對環境對於老師來講有一些強制性的要求，還是不太能夠被接受的，是嗎?

講話人 2：是的。

講話人 1：好的，我就大概對您的基本信息有一個瞭解了，下面我想深入的瞭解一下您在課堂上會怎麼做。我想問一下，您會在您的數學課上融入有關環境知識的內容嗎?

講話人 2：幾乎沒有。

講話人 1：學校也沒有這樣的要求?

講話人 2：對，我們像對理科的學科，像數學，包括那種課可能會要求沒有那麼高，他可能會對人文類的學科，比如說語文這種課，他們可能會有要求。

講話人 1：好的，因為我剛剛才瞭解到您是一個班主任的老師，其實作為一個班主任的老師，學校有沒有要求在班會課上必須要去安排環境知識教育方面的內容?

講話人 2：這個我們學校要求。會給學生教育環境相關的知識。我們是每週一次班會，班會的主題每次都不一樣。大概我們要是對環境來講，差不多就是一個月可能會組織一次跟環境相關的班會。

講話人 1：這是學校要求的，還是說您自願把這個課程安排成這個樣子的?

講話人 2：學校要求的。

講話人 1：如果通過您個人意願，其實是很少會涉及到跟環境有關的內容，是嗎?

講話人 2：是的。

講話人 1：我明白了，那如果您在班會課上安排的關於環境方面的這些內容，對學生來說他的反響會好還是不好?

講話人 2：還可以，因為孩子們可能會對這個比較感興趣。

講話人 1：因為他們會感興趣，也就是說學生還是可以通過班會課上的內容能收穫到一定的環境知識，是嗎?

講話人 2：是的。

講話人 1：好的。我還想問一下，我瞭解到綠色學校的一些相關的評選標準有要求老師會發表一些呃在一些著名的期刊上或者報紙上、校報上發表一些關於環境方面的言論或者是文章。那您有沒有發表過類似的這些文章呢?

講話人 2：我目前還沒有發表過這個文章，因為我們學校沒有這個要求。

講話人 1：您學校就是您所在的綠色學校對這個的要求不是非常的嚴格，是嗎?

講話人 2：對，我們目前好像沒有要求，一般好像語文老師可能會寫相關的文章或者是會有類似的教育，但是我們數學老師目前沒有。

講話人 1：好的，您有沒有過多的去瞭解過關於學校建立綠色學校的一些條件或者是要求?

講話人 2：有所瞭解，因為這邊都給班主任下發了文件。

講話人 1：好的，那大概是怎麼樣的一個要求呢？

講話人 2：分幾個體系，比如說像學校體系建設，包括教育管理類的，還有現場評定，教育局會過來派人大概你像學校制度體系的要求，就大概可能會建立一些綠色學校的這種出台的管理體制、學校有方針，例如我們學校就包括保障措施、激勵機制這種方面都是學校硬性要求。

講話人 1：明白。

講話人 2：像管理類的我們就會比如說在宣傳欄，包括海報、標語，像我們的廣播站定期都會發表相關的文章之類的。大概就這幾種。

講話人 1：好的，那您是否有興趣去瞭解一些有關環境的信息呢？

講話人 2：我目前沒有這個需求。

講話人 1：那大概原因是什麼？

講話人 2：可能我覺得，對我個人來講，沒有能做到一些我認為很有必要的東西。沒什麼必要。

講話人 1：您覺得環境還是一個層面比較高的一個話題。比較空是嗎？也就是說如果要去瞭解，也是學校規定的，是嗎？

講話人 2：對，學校規定或政府規定，就是這種的。自己可能確實是沒有時間，也沒有特別大的興趣。

講話人 1：因為這個東西離我們還比較遠是嗎？

講話人 2：對，我們教學壓力也挺大的，你像如果在搞這種活動，就可能會對我們的教學質量會產生影響。

講話人 1：好的。我還想問一下，您是否自己會自願或者是有興趣去參加一些有關環境保護的活動？

講話人 2：如果有時間可能會，但是現在我們也比較忙，因為教學壓力也比較大，現在也年末了，我們主要還是以教學為主。我個人來講，假期也非常少，還是心思都在學生身上。

講話人 1：我還想再瞭解一下，您會有意願去主動做一些保護環境的事情嗎？

講話人 2：如果政府有要求，比如說有垃圾分類，我可能會順手分分的一下。但是你說刻意的去做一些對環境有保護的東西，我好像沒有。不會特別刻意。

講話人 1：因為還是覺得跟自己生活不太不是特別的貼合，是嗎？

講話人 2：對。

講話人 1：好的，學校如果有這方面必須要老師去做什麼，你也是會按照學校的要求去做什麼。

講話人 2：是的。

講話人 1：還想瞭解一下，您會去分享一些看到的關於環境問題以及環境知識的信息給身邊的人嗎?

講話人 2：應該不會。一般可能學校會強制要求，但如果不是強制，我們一般不會。主要對這個不是太感興趣。

講話人 1：也對，因為平常對老師的教學質量還是要求很高的，是嗎?

講話人 2：對。

講話人 1：好，我還想大概瞭解一下，您認為學習和瞭解更多的環境知識能夠提高您的環境保護意識以及環境保護行為嗎?

講話人 2：看個人，就我來講應該不會，我覺得我一般思想理性一點，我會認為如果我做這件事會對環境有特別大的益處，我可能會做。但是如果這件事我覺得我做的非常微不足道，或者是反其道而行，按照這個就可能並不會對環境有很好的影響的話，我可能就不會做。我舉個例子，比如說現在政府會推崇一些電動汽車之類的，宣傳是會為了環境保護做綠色能源。但是我個人認為，你像現在發電還主要是火力發電，你產生的廢氣我覺得會更多一些，我並不會認為這個東西會對環境有很好的改善。所以我不會去根據這個倡導去做一些行為，比如說買電動汽車之類的。

講話人 1：其實還是因為它只能說是達到一個比較理想化的狀態，但是實施起來還是比較困難的，是嗎?

講話人 2：對，因為實施起來並沒有像大家理想化那麼好，因為畢竟現在除非現在全都換成風力發電，可能會對環境造成影響。但現在，是火力發電為主。就我覺得排放的二氧化碳應該是和燃油車沒有錯太。

講話人 1：對，是的，這個倒是一個非常重要的一個影響環境的一個因素。雖然科技在不斷的進步，但是還是會出現一個比較理想化的狀態，是我們達不到的但這其實這樣看來，我覺得您對環境知識的瞭解還是挺豐富的。

講話人 2：對，對。

講話人 1：好的，我最後一個問題是想問您，在綠色學校任教這麼多年以來，綠色學校的一些政策和對老師在環境知識或者是環境意識和行為上的要求，是否起到了一定的積極的影響呢?

講話人 2：我是認為有些制度是不太，嗯，我覺得對這個不是太有幫助。

講話人 1：是不是有些還是比較沒有用?

講話人 2：對，你像推崇綠色建築或者是像校園的過多的綠化，要達到百分之多少這種硬性要求，我覺得很沒有必要。因為其實很多學校它在市區里是根本達不到這樣的一個 30%多的一個綠化的一個面積，這個要求也有點太過於嚴格了。對，還有像衛生死角這種方面，你如果因為這種小事去評定一個學校是否為綠色學校，我覺得這個評分制度是有問題的，因為它佔的分值也比較高。是的，確實這個影響也是挺有有一定的這種負面的影響，就會讓誤判別人的一種對綠色學校的一種看法，是這個意識吧?

講話人 1：好的，我對您的這個情況有一定的瞭解，我就非常感謝您能配合我完成本次的這樣的一個採訪的這樣的一個研究。謝謝您。

講話人 2：好的，那不用謝不用.

G4 語文教師

講話人 1：不好意思，剛剛出現了一點故障，我們繼續開始。您剛剛談到您的教齡，大概是 20 年左右的時間，我想對您的學歷背景進行一個採訪，您的學歷背景是什麼?我的意思是您最高的學歷是什麼，並且您的在大學裡面學的學科是什麼?

講話人 2：好的，那我的一個最高的學歷就是碩士，我一直以來學的就是語文教育的一個方向，所以我一直以來對語文教育就有很大的興趣。

講話人 1：好的。我也想知道，那您在之前有沒有教授過其他的科目？ 就比如說在從事語文教育之前。有沒有教授過其他的科目，如果有的話，您教授的是什麼學科?

講話人 2：其實在接受語文教育之前，我是沒有教授過其他學科的，因為就像我剛才說的，因為我的背景就是語文教育，所以我從畢業以後我就來到學校一直從事語文教育的工作，並沒有教授過其他方面的學科。

講話人 1：好的，我想問一下，您是什麼時候來這所學校任教的呢?

講話人 2：我大概差不多畢業以後就來到這個學校任教了，那個時候應該是 2000 年左右。所以我來到這以後，就一直安排我當語文學科的老師，所以我在語文學科上面還是有一定的見解的。

講話人 1： 好的，非常感謝您的回答。所以您在來之前，現在的這個學校還並不是綠色學校，是嗎?

講話人 2：對的，因為我來的時候它還是一個比較普通，而且綠色建築面積等等方面都沒有現在這麼的繁華。因為 2000 年的時候，這個學校也剛成立不久，差不多到現在為止，經歷他從一個非綠色學校變成綠色學校的這樣的一個過程，我就是看到學校當中有很大的改變，並且它的一些綠色基礎設施也得到了很大的完善。

講話人 1：好的，很感謝您能跟我分享這麼多學校的信息，我還想問一下，您目前來說是班主任老師嗎?

講話人 2： 目前來說，我是學校班主任老師，因為學校就會安排主課的老師，比如說語文、數學或者是英語這類主課的老師當班主任，可以方便我之之後後期的一個職稱的評選，並且也有這樣學校也有這樣的一個要求。

講話人 1：好的，我對您的基本信息就有了一定的了解，我現在想問一下，您有接受過和環境教育或者是環境知識相關的一個培訓嗎?

講話人 2：如果是在我學習，就是本科或者碩士學習的期間，我的確是沒有接受過這樣的一個相關的培訓。因為我也說過我是學語文教育的，這種偏理科方向的這樣的這些培訓是沒有的。但是我來到學校以後，根據學校綠色學校的這樣的一個評選的這樣環節和一個政策，學校給我們每一個老師都安排了會去接受一定的環境教育的一個培訓，就會讓我們了解到更多的環境知識，並且知道應該從什麼樣的方向去保護我們的環境，就差不多應該是這樣的一種模式。

講話人 1：ok ok，我大概了解了。我可不可以問一下，您接受的這些環境知識相關的培訓，是以一個怎樣的形式呢?

講話人 2： 他大概是這樣的，學校會針對不同科目的老師安排一些不同的課程，根據這些課程，你每個月或者是每個禮拜、或者是每個學期都要完成相應的課程。有的時候學校也會從外面請一些專門的專家來進行一些講座，然後會聽一些講座。也有的時候學校會舉辦一些讓老師帶著學生們去參加一些學校當中舉辦的一些環境的一些活動。

講話人 1：我大概了解了，也就是說就是您的主要的一個方式也是有以授課為主的，對嗎?

講話人 2：對的，其實授課還是比較主要的，學校每個學期會在老師的課程安排和學校課程安排都沒有那麼緊密的情況下，就會每周安排差不多一節課的時間，讓老師們進行一個環境知識方面的一些培訓。

講話人 1：好的，那我大概有所了解了。也就是說學校就會專門為老師們舉辦一些關於和環境教育有關的活動，對嗎?

講話人 2：是的。有的時候不僅會有一些課程，而且還會舉辦一些活動，比如說老師需要帶著學生去參加一些植樹造林的活動，並且需要和學生們一起完成一些跟環境有關的一些課題。這種課題是比較簡單的，因為我們是以小學為主，這種課題是比較簡單的，就會向學生們傳遞一些怎麼樣去保護環境一類的這樣的一類的知識。

講話人 1：我還想問一下，如果學校有安排這樣專門的環境教育培訓，您剛才也說了，差不多是每週一節課的時間，是嗎?

講話人 2：是的，具體還是要看老師的安排，老師可以選擇性參加，但是學校每個學期每週都會在指定的時間安排一節課，如果那個時候你沒有時間去參加，你比如說你要去上課或者你有其他的教研任務要完成，你就要需要先去完成自己的教研任務，然後再去參加這樣的一個環境培訓的課程。大概就是這樣的一個形式。

講話人 1：ok，好的。那您覺得學習環境教育就是和接受這樣環境相關的這樣培訓，對您的個人來說有沒有一個很大的用處？為什麼？

講話人 2：我個人覺得其實還是非常有用的，因為其實保護環境是我們現在每個人必須要做的事情。前幾年我們也知道在北京有很多的霧霾，對我們的身體健康造成了很大的影響。這樣大多數情況下，我們就可以覺得是工廠的廢氣以及車輛的尾氣造成的。這些因素都可以導致我們的身體健康陷入到一個非常嚴重的境地。所以我覺得我通過學習了環境知識以後，我就覺得我應該知道怎麼樣去保護我們的環境。從哪一個方面去著手。所以說不僅是從我們生活的這樣的一個環境來說，對我們的健康以及對我們人類的一個發展都是非常有用的。 好的，我聽您講完以後，我也就覺得您確實是對這樣的一種活動有一個就是這樣的一種培訓，有一個自己比較深入的了解。

講話人 1：我還想大概問一下，您在接受過這麼多的環境培訓當中，有沒有哪一個是令你印像比較深刻的呢？

講話人 2：印象深刻的這種環境方面的這些培訓其實還是有的。就比如說我們的這個嗯保護黃河的這樣的一個項目，也因為我們鄭州是在黃河沿岸的，所以黃河水的污染以及黃河水的一個治理對我們來說是非常的重要的，所以我們學校就會帶著我們一起去黃河邊去撿一撿垃圾，讓學生們盡可能多的去接觸到黃河，知道黃河為什麼叫黃河，它現在存在的一些污染問題又是什麼，我們對這些的活動的舉辦，以及我們從中學到的這些知識，告訴了我們應該去保護我們的母親河，能夠因為保護我們的母親河也是造福我們自己人類。 好，我大概是了解了。我想知道您做這個的目的是什麼？您覺得它可以解決什麼樣的一個問題。 比如說保護黃河的活動，它就會讓我知道怎麼樣不去將垃圾盡可能地排在河流裡，這樣就對我們的環境會有一定的影響對吧，會有一個好的影響。

講話人 1：我還想問一下您在課堂上的這樣的一個安排，因為您是綠色學校的中文老師，我想大概了解一下，您會在您的課堂上融入有關環境知識方面的內容嗎？

講話人 2：其實是會的，因為首先來說學校有這方面的要求，讓我們可能會將我們的課程融入一部分的環境知識，這樣方便學生不僅僅只了解到了一些語文知識，同時也能夠從語文課堂上更加深入的去了解一些環境知識。

講話人 1：好的。那您的意思，學校有要求您這麼做，那您自己主動會去把環境知識融入到課堂當中嗎？

講話人 2：其實因為我提到了，因為我之前提到了我本身的一個專業是學語文教育的，我對環境知識的這方面的了解並不是那麼深入，也是等到我來到學校，當學校申請上綠色學校以後，我們才接觸的相關的培訓。所以如果是從我個人而言，我可能不會花過多的時間去把我的這樣的一個課堂融入一些環境知識的。

講話人 1： 請問您是用什麼樣的一種形式將環境教育融入到自己的課堂當中？

講話人 2：有的時候我會，因為我們的語文課本上現在有一些文章跟保護環境有關係的，所以我通過在講解這些和保護環境有關的語文課本上面的一些課文，同時找一些與此有關的這些資料，像以這樣的方式來傳遞給學生。也就是說您是語文課本上我們現在的語文課本上是有這樣的一個課文的呈現。

講話人 1：那我還想了解一下。嗯。學校會要求老師專門用一節課的時間去。講關於環境主題的課程嗎?

講話人 2：這個是不會的，對語文學科方面上是沒有這樣的一個要求的。 好的，我記錄一下，謝謝您。

講話人 1：我還想知道您剛才提到您是學校的一個班主任老師，是嗎?

講話人 2：如果是班主任，會不會要求就是學校會不會要求每個學科的班主任在班會課上去專門講解環境知識的內容。 這個學校是有要求的，因為每週都要進行一次班會課，針對綠色學校來說，班會課上一定要呈現環境知識上方面的內容。但是作為班主任來講，我可能會去尋求一些自然科學老師的幫助，而我自己是後期接受了這些方面的培訓，我怕有些知識我可能會講解的不到位，可能我們學校環境知識方面的老師也會對這些就是對這些方面了解的會比較深入，他們可能會講解的更加的具體和全面。偶爾學校也會請一些其他和環境有關的一些環境專業有關的學生，就就是大學生或者是一些比較權威的專家來和學生進行一個探討來探討一些關於環境方面的知識。

講話人 1： 好的。那我大概了解了。您剛才也提到了，差不多每週都會有這樣的一個班會課，那也就是還是能夠讓學生更多地去了解到這樣的一個環境、知識。你覺得學生對這樣的一種課程安排的反應會會好嗎?我的意思是學生會不會通過這樣的一種授課形式收穫到更多的環境知識呢?

講話人 2：這個是肯定的，因為學生呢在這方面還是說，呃，有的學生還是非常感興趣的，但是學生也是比較欠缺這一方面的知識的，所以通過不管是通過一些專家的講解，或者是我們老師課堂上的講解，還是特別能夠勾起學生的興趣，並且學生的反響是特別好的。覺得能夠通過課堂上這些具體的例子，比如說有些老師會在課堂上講如何保護海洋，如果你不斷的去把這些白色垃圾排放到海洋當中，會對海洋生物造成怎樣的影響。也會播一些紀錄片給學生們看，這樣學生們通過這樣的一種方式能夠加深自己對環境的一個印象，並且從自身做起能夠去更好的保護環境。

講話人 1：好的，那我對您的這樣的一個基本的授課信息有了一定的了解，我還想問一下您有沒有發表過一些關於環境方面的文章?

講話人 2：這個我是沒有發表過的。 好的，您了解過學校會不會有要求去讓每個科目的老師去發表一些關於環境的文章。 這個是看老師自願，如果你要是覺得一個老師要是覺得自己的環境知識程度和水平都比較高，並且能夠有一個更好的理解和見解，有可能會發表文章。對，是類似於這樣的。

講話人 1：好的，我大概了解了。您有了解過關於學校建立綠色學校的一些條件或者是要求嗎?

講話人 2： 這個我也是有所了解的，因為我們會經常的學校會組織老師們去開一些研討會，開研討會的時候就會佈置一下任務，告訴老師下一步應該怎麼做，老師應該盡量多的去參加一些環境方面的這些相關的培訓，並且多帶著學生參加一些學校組織的這些環境方面的活動，這些是必須的。而且包括學校的一些建築面積以及綠色基礎設施，都還是需要有一定的要求的。 好的。那請問您是否有興趣去了解一些有關環境的信息呢? 這個應該是我是比較有興趣的，因為我是在綠色學校任教，或多或少我都要接觸一定的環境信息，這樣也是學校的要求。

講話人 1：好的。那您會具體瞭解哪一方面的信息?

講話人 2：就要分很多種了，一般情況下我都會關注一些與生活相關的信息，比如說我們都會經常提到的一個碳排放量以及節能減排，這些都是對我們生活和健康息息相關的，所以我就會大量的去關注一些。而且我自己的這個車子呢就是一個新能源的車子所以我就覺得我可能會從自身做起，去保護一下我們的環境，為我們的環境盡一份微薄之力。

講話人 1：好的。在您瞭解到的環境信息中，有沒有哪個方面的環境信息讓您印象非常深刻的呢?

講話人 2：其實有很多這個具體的我暫時也想不到，但是我確實是感覺我學到了、這麼接觸過這麼多的環境培訓，我覺得這個環境真的是覆蓋了方方面面，它不僅僅只是針對我們的生活，我以前可能過多的會去瞭解一下我們的生活，但是現在我會發現包括大森林、海洋以及亂砍、亂伐、以及海洋保護，在我們的生活當中都是非常重要的。所以看到一些有關於破壞環境方面的信息，我的心情還是會非常的糟糕。

講話人 1：好，那您覺得瞭解到這些環境知識會不會對您的生活有什麼影響?

講話人 2：這個就對我的生活有很大的影響，像我剛才說的，如果我不瞭解到這麼多的環境，只是不瞭解到我們目前生活的這樣的一個環境會存在的這些環境問題，我也並不會去選擇一些節能減排的生活方式，我自己的車也不會去選擇新能源。所以我覺得瞭解這些環境知識，對於改變我自己的一種綠色出行的生活方式還是非常有幫助的。

講話人 1：好的。您是否有興趣會參加一些關於環境保護的這樣的一個活動?

講話人 2：當然我還是非常有興趣的。

講話人 1：您會具體參加關於環境的哪些方面的活動呢?

講話人 2：比如說我比較感興趣的就是節能減排，因為它和我們的生活是息息相關的，我也特別感興趣。這些垃圾的分類、垃圾的處理應該是怎麼樣子的。

講話人 1：所以其實您是參加學校舉辦的活動多一點是嗎?

講話人 2：是的，我一般情況下只會參加學校舉辦的活動，因為這個是學校的一個要求。學校舉辦的這些活動也能夠涵蓋我想要瞭解環境的方方面面的一個內容。但是如果因為我的時間也有限，因為做了班主任以後，而且是主科的老師，就會時間比較有限，可能沒有特別多的時間去參加其他地方舉辦的這樣的一個活動。

講話人 1：好的。那我想問一下，您覺得這些活動會幫助你想要去瞭解一下這個環境嗎？或者是有沒有幫助您會去做一些保護環境的事情？

講話人 2：肯定是有的，像我剛才提到的這些對我的生活會有一定的幫助，所以我覺得多瞭解一些環境信息還是很好的，至少讓我們知道我們現在生活的這樣的一個環境，它會存在什麼樣的一個問題。

講話人 1：好的。我想大概瞭解一下，您會有意願去做一些保護環境的事情嗎？

講話人 2：這個是肯定的，因為我是綠色學校的老師，我必須會有這樣的一個環境意識去做這樣的一個事情。

講話人 1：好的，您具可以具體的說一下，您都會去做一些什麼事情嗎？

講話人 2：就比如說我可能是從我自己的小事做起，因為可能大的方面也不一定會需要我去做很多事情。比如說我離開家的時候，我就會隨手把我充電的電源給拔掉，不然後造成就是不會讓他去浪費很多的電，我也不想會造成很多的光污染，我就會選擇把燈關掉把不用的燈關掉或者我看到有人隨手丟垃圾，我會上前去制止他隨地吐痰這樣的一個行為，我都會上前去制止他，因為不想讓他污染到我們生活的環境。隨地丟垃圾我就會告訴他如何進行一個垃圾的分類，可回收還是不可回收這一類的，這些都是也都是靠之後在學校進行的這些環境培訓所學到的一些內容。

講話人 1：好的，我大概瞭解到了。那您會去分享一些您看到的關於環境問題以及環境知識的信息嗎？

講話人 2：這個是偶爾，因為不一定所有人都會有時間去就是我的意思是不一定所有人都會有時間有興趣去聊這個話題，而且這個是一個層次層面比較高的一個行為和意識，所以可能很多人就涉及不到這個方面，所以也就不會主動的去和別人去提這些。

講話人 1：好的，我大概瞭解了。您認為學習、瞭解更多的環境知識，能夠提高您的環境意識以及環境行為嗎？

講話人 2：我覺得這個是肯定的，因為你瞭解了更多環境知識，你就知道現在環境方面有什麼樣的一個問題。當你知道這個問題的時候，你就知道這個問題的嚴重性，你知道嚴重性，自然而然就會讓你去有這樣的一個意識去保護我們的環境，並且會做出一些保護環境的事情。即便是你可能有些時候不會主動的去做一些保護環境的事情，但是當你瞭解了更多的環境知識和環境信息，你就會知道你可能會不會去做這些保護的事環境的事情，但你也不會去破壞環境，所以我覺得他們之間是有一定的關係的。

講話人 1：好的，我覺得您對環境的瞭解還是非常的深入的。我最後一個問題就是想問您，您您認為在綠色學校任教這麼多年以來，綠色學校的一些政策和對老師在環境素養上的要求是否起到了積極的影響，為什麼？

講話人 2：這個是肯定的。這個是肯定的，因為我之前也說過，因為我的本科和碩士的專業它並不是環境教育，所以在這之前我其實很少會去瞭解環境方面的這些信息。但是經過學校給的這些培訓以後，我會發現我逐漸更有興趣想要去瞭解環境，我覺得做一些保護環境的事情是我應該做的，而且我也是一名老師，我應該以身作則的去做這些事情，因為我覺得我的這些行為可能會影響到我的學生。更主要的一點就是像我剛才提到了環境是一個層面比較高的東西，所以還是需要像綠色學校這樣的學校去能夠讓更多的學生瞭解到我們現在處處的這個身處的環境還是存在很多問題的。

講話人 1：所以您是。非常鼓勵建立綠色學校的，是嗎？是的，這是肯定的。

講話人 2：好的。本次的採訪就到這裡結束了。我最後。還是非常感謝您的參與。並且非常感謝您的配合，如果有時間我們再聯絡，謝謝。

講話人 1：好的。

NG 1: 自然科學老師

講話人 1：首先，我非常感謝您能夠在百忙之中來參加我的訪問，我先對我的研究進行一個簡要的介紹。本研究主要是對鄭州市綠色學校和非綠色學校的一個關於老師環境素養的一個研究。本次採訪的時間大概是 20 到 25 分鐘的時間，我對您的參加表示非常真心的感謝，謝謝您的參加。

講話人 2：好的。

講話人 1：那我就開始了。首先我想對您的學歷背景做一個大概的瞭解，我想問一下您是哪一門學科的老師？

講話人 2：自然科學。

講話人 1：好的，那您的教齡大概是多長時間？您是什麼時候開始教授自然科學的？

講話人 2：98 年。

講話人 1：那您的學歷背景大概是什麼樣子的？

講話人 2：我是大學本科。

講話人 1：您在大學本科當中學的專業是什麼？

講話人 2：我的專業不是自然科學這一門學科。

講話人 1：好的，沒關係，那您的專業是什麼？方便透露一下嗎？

講話人 2：我的專業主要是文學類。

講話人 1：是不是語言文學那一方面的，還是說是其他的一種文學方面？

講話人 2：語言文學。

講話人 1：語言文學。好的，我想問一下，您在教授自然環境科學科目之前有沒有教授過其他科目？

講話人 2：教授小學語文。

講話人 1：那好的，那您大概教這個語文科目教了多長時間？因為我剛才瞭解到您是 98 年就當老師了，是不是教語文科目教授的時間也比較長。

講話人 2：是的，大概有 10 年左右。

講話人 1：那就是說後來就不再教授語文科目了，就變成教自然科學了。

講話人 2：對，因為學校有這方面的要求。而且當時沒有太專業的自然科學的這一門學科的老師，所以就把我調去帶這一門課了。

講話人 1：明白。也就是說因為師資力量不夠，就把您調到自然科學這方面來當自然科學方面的老師，是嗎？也是可以理解的。我就是想瞭解一下，您有沒有接受過和環境教育或者是環境知識相關的這種培訓？

講話人 2：沒有說特別專業的去接受過。自從學校安排教這一門學科的時候，從那以後開始去接觸這方面的內容，也是邊學習、邊授課，是這樣的。不是說非常的專業。

講話人 1：好，我大概明白了，也就是說您還是有接受過相關的這種環境的這種培訓，但是並不是說是您自願的會去學到這些東西，是嗎？

講話人 2：對，因為我的最初的專業也不是學這個的，等於是中途才開始去接觸、接受，在自己的學習的過程當中再去授課，是這樣的。

講話人 1：您在接受學校給的這些相關的培訓的情況下，它是一種什麼樣的形式呢？比如說它是安排的一種課程，還是說是有研討會，或者是說給您舉辦一個活動，讓您從活動當中去學到這些知識呢？

講話人 2：是每周只有一節安排的課程。

講話人 1：每周會有一節安排的課程，是嗎？好。每周的課程，好，我記錄一下，謝謝。也就是說學校也就會專門為了環境教育對老師們開展一些培訓，是嗎？

講話人 2：對有這方面的培訓。

講話人 1：具體是培訓哪一個科目的老師，是自然科學的老師，還是說所有的老師都可以去參加？

講話人 2：是自然科學，對。

講話人 1：好的，那您可以具體的說一下是哪一類的環境活動嗎？

講話人 2：一般就是說從綠色的植被，因為地理位置方面的，鄭州是屬於中原地帶不像哎不像我國的南方那些呃所有的植被都是比較讓學生有一個直觀的去觀察到，在我們這邊就會有一些就是說只是理論上的，你會去跟他講一些這些，這大概這一方面的。還有關於大自然的環境，比如現在的汽車的尾氣，也會給自然環境造成危害。還有等等一些沒有辦法一一列舉，能在現實生活當中接觸到的一些，都會給同學們傳授到。

講話人 1：好，我大概瞭解了，針對這樣的一個環境教育的培訓，也就是說學校每周都會給您做給您所在的學校的老師進行一個安排，是嗎？

講話人 2：對，每周只會安排一節課。

講話人 1：好的。我想再瞭解一下，針對您個人而言，您覺得學習這些環境教育或者是接受的這些相關的環境培訓是否有用？

講話人 2：很有必要。

講話人 1：那大概原因是什麼？

講話人 2：因為隨著社會的發展，保護環境是在每個人心目當中都成為了一個呃就是很自然的一種觀念。所以大家在這方面的一個嗯就是在關於自然環境保護方面都有這樣的意識。

講話人 1：好的。

講話人 2：所以對很有必要。

講話人 1：也就是說會提高您的一個環境意識，所以說您是非常願意去參加這樣的一些環境教育活動，是嗎？

講話人 2：對的。

講話人 1：您有沒有在您接受過的這些環境培訓當中有一些印象深刻的內容。

講話人 2：印象。我想我可以打斷一下嗎？

講話人 1：可以。

講話人 2：你所指出的印象深刻的內容是它涵蓋哪些方面？能不能給我一個提示？

講話人 1：就比如說簡而言之，我們現在就比較關心的是我們現在生活的這樣的一個空氣質量，那比如說我會選擇一種用綠色出行的方式來去降低空氣當中的一個碳排放量。那我就想大概瞭解一下，您有沒有接受過類似於這樣的一種環境知識或者是環境的一些活動，是能讓您有一個深刻的印象，讓您有一種想要去改變環境的一個意識或者是行為。

講話人 2：有的。從生活呃就是日常生活上來講，盡可能的我們就減少機動車出行的次數。也會給同學們傳授一些不要讓家長總是開車來接送上學這樣的方面，從政府方面就會有專業的一些那種活動宣傳到學校。

講話人 1：好的，我大概瞭解了，但是因為您的背景並不是說是學環境教育或者是跟自然教育有關的，對教自然科學這一門課程是不是還是有一定的挑戰？

講話人 2：是的。雖然是大家都有這種意識去保護環境，但是具體到它畢竟來說，它確實是一門科學類的學科。如果想深入的瞭解，還不是說單純的告訴大家，就說要嗯僅僅是理論上的維護環境這些遠遠是不夠的，還需要提高同學們的這種意識，包括這種社會民眾的這些大眾的這些意識，這些都是有待提高的。

講話人 1：好的，我大概瞭解了，我想對您授課上面做一個簡單的瞭解。您呢因為是自然科學的老師，您會主動地將環境知識融入到您的課堂當中嗎？您有興趣去做這樣的事情嗎？

講話人 2：我有興趣，但是就目前我授課的這個方面也是一直在不斷的探索、不斷的學習當中，然後再教授給同學們。所以一直怎麼說呢邊學習、邊授課，就是這樣的。

講話人 1：好的，我大概瞭解了，但是如果您有興趣，有沒有想過會用怎樣的方式去教授和環境有關的課程？

講話人 2：我有想過帶同學們到大自然的環境當中去，身臨其境的這樣的一種授課方式，也有想過。

講話人 1：好，我明白了。您還是會想著用一些比較類似於 file trip 這樣的一種授課形式，來去讓學生們更多地去接受大自然。

講話人 2：嗯。

講話人 1：您會有興趣去參加一些關於環境保護或者說是宣傳環境知識的活動嗎？

講話人 2：對，有機會、有時間的情況下，我都會參加的。

講話人 1：好，如果您有時間，一定是會去參加的，那具體是哪一類的活動如果您想參加的話您具體想參加哪一類的活動？

講話人 2：如果是政府舉辦的一些活動宣傳，我有時間我都會以志願者的身以志願者的身份去參加。

講話人 1：好的。您有沒有參加過哪一類的活動是讓您比較難忘的、記憶比較深刻的。

講話人 2：有參加比如就像舉辦的有一些馬拉松比賽，在這個比賽過程當中會有一些給運動員遞水、擦汗、把這些散落下來的飲料瓶，對這些垃圾我都會幫忙就撿起來、收起來這樣的。

講話人 1：您做這些事情的目的是為了什麼？

講話人 2：目的是一個是呃我認為我自己就是一個自然科學的授課老師，我就是要自己親身去體會保護自然的行為。再一個就是從我內心來講，我是非常希望無論是環境還是這一下想的太多了，一切都是為了那美好吧。

講話人 1：好好，我懂了。那就是學校會不會為老師還有學生們提供一些保護環境的活動，或者是一些跟環境教育有關的活動?

講話人 2：學校是提倡的。

講話人 1：好，也是會有的是嗎？您鼓勵學校會不會多舉辦一些類似於這樣的活動?

講話人 2：會向學校提出一些建議。

講話人 1：那為什麼會這麼做?

講話人 2：因為全世界、全球現在都是以環境保護為重點的，所以作為我們中國一個大國，咱們不能說做到人人都能做到，還是盡自己最大的能力，從我做起，從娃娃抓起，讓大家都有一個很好的意識。從小給孩子們培養一個好的意識，所以才能有利於我們的一些環境保護。

講話人 1：好，我大概瞭解了，還有兩個問題想問您，您會有興趣主動去做一些保護環境的事情嗎?

講話人 2：有興趣。但是現在可能是有 I 心有餘力不足的那種感覺。自己只要是有這方面的活動，我還是會去參加，但是說讓我自己去組織一些，可能目前我還做不到。

講話人 1：我大概還想瞭解一下，如果您會去做這樣的一些保護環境的事情，您具體會做哪些事情?

講話人 2：比如提倡大家出行的時候盡量的使用公共交通工具。還有就是呃比比如啊這是生活當中常見的，大家在養寵物、遛狗的過程當中，一定要及時的清理寵物的糞便。我就會提醒大家，包括走在路上那些隨手扔垃圾的，我就會上前去勸解和阻止。

講話人 1：很好，您的環境意識是非常強的。我還是想最後問您一個問題，您覺得您學習或者瞭解更多的環境知識，是否能夠提高您的環境意識以及環境行為?

講話人 2：一定會的。

講話人 1：您可以具體說一下原因嗎?

講話人 2：具體原因首先是從個人的這個素質和修養，這跟個人的素質和修養還是有一定關係的。還有你可能一個不經意的一個小舉動也會影響到、帶動到身邊的人。

講話人 1：其實您覺得如果您瞭解更多的環境知識，其實是可以影響到您的意識和行為，對嗎?

講話人 2：對的，還可以傳授給身邊的人。

講話人 1：就知識可以改變您的生活，就是這個意思。

講話人 2：對的，對。

講話人 1：好的，我對您的情況有了一個基本的瞭解，本次採訪就到這裡結束了，非常感謝您對本研究的一個支持。

講話人 2: 好的。謝謝。

NG 2: 語文老師

講話人 1：首先非常感謝您能接受我本次調查研究的一個採訪，我先簡要介紹一下本研究的主要目的。本研究的主要目的是針對鄭州的綠色學校和非綠色學校的老師的環境素養，也就是環境知識、環境意識以及環境行為的一個採訪。非常感謝您能抽出寶貴的時間來配合我完成本次調查研究。

講話人 2：好的。

講話人 1：我想先對您的背景進行一下瞭解，我想瞭解一下您是哪一門學科的老師?

講話人 2：我目前是教語文的。

講話人 1：好，您的教齡大概是多長時間?

講話人 2：目前教齡是 7 年。

講話人 1：七年，好，謝謝。那您的學歷背景是什麼呢？您的最高學歷是什麼?

講話人 2：我的最高學歷是碩士，學的是漢語言文學專

講話人 1：您在教語文課之前，有沒有從事過其他科目的一個教學?

講話人 2：我當過代課老師，美術老師。

講話人 1：那大概是教了多長時間?

講話人 2：因為他是代課老師，所以大概有 2 年時間左右。同時帶語文課和美術課。

講話人 1：那就是就相當於一個老師教了兩門課，有語文課，也有美術課，是嗎?

講話人 2：對。

講話人 1：好的，那請問您對綠色學校有沒有一點瞭解?

講話人 2：稍微有一點瞭解，但是可能我們這邊綠色學校跟香港那邊不太一樣。我瞭解的是目前綠色學校可能更多的是在於校園的環境方面，比如說衛生方面會比較注重一點。

講話人 1：那就是不是我們新型定義上的綠色學校。

講話人 2：對，以乾淨衛生為主。

講話人 1：好的，我大概瞭解了，我想問一下您有沒有接受過和環境教育或者是環境知識相關的培訓？

講話人 2：目前我沒有接受過專門的培訓。

講話人 1：那您現在所在的這個學校，它會不會專門為老師舉辦一些關於環境教育的相關培訓？

講話人 2：可能培訓不會有，但是會組織一些活動。

講話人 1：那可不可以具體介紹一下是哪一類的活動？

講話人 2：你像我們學校來講，偶爾會帶學生一起在附近的公園或者是綠地、街道進行撿紙屑、樹葉、垃圾等活動。還會組織一些活動，比如說，我們有有機的農產品基地，我們學校自己也有農業基地，種的有花生、紅薯之類的，讓學生自己體驗有機蔬菜的種植，也可以讓學生進行採摘之類的。

講話人 1：大概時間就是確定一點的時間安排是怎麼樣的呢？

講話人 2：差不多兩週一次。

講話人 1：好，謝謝。我大概對這個基本情況有所瞭解，我想再瞭解一下，您覺得學習環境教育或者是接受這種環境知識的活動對您來說有用嗎？

講話人 2：肯定是有用的，因為我覺得不管是在教育方面，還是在日常生活方面，這些都是很有必要的。

講話人 1：那可以具體說一下原因嗎？

講話人 2：可能現在的學生們的環境意識沒有那麼強，這個就需要我們作為小學老師帶領他們去進行一些環保活動，提高他們的環保意識。

講話人 1：也就是說老師起到了一個引領的作用。有沒有哪次活動或者是培訓讓您印象比較深刻的？

講話人 2：好像沒有沒有特別多。

講話人 1：好的，我大概瞭解了。我想具體瞭解一下，您在您的課堂上會主動地將這個環境知識融入到您的課堂當中嗎？

講話人 2：會，因為我我教的是語文課，結合課文我們會講一些關於環境的實例，或者是關於環境的一些典故。

講話人 1：您覺得學生是否可以通過您的課堂內容學到更多的環境知識？

講話人 2：肯定是可以的，因為可能他們在家沒有那麼多關於環境的意識，包括家長可能沒有那麼多時間去帶領學生去完成這種課外的功課。

講話人 1：明白，那證明您的環境意識還是非常高的，有這樣的一個意識去培養自己的學生。我還想瞭解一下，在您的生活當中，您會主動地、自願地去瞭解一些環境知識，或者是看一些跟環境相關的內容或者是文章嗎？

講話人 2：我可能不會刻意的去看，但是如果是通過那種網絡平台，類似於微博或新聞的一些軟件，可以瞭解到很多關於環境的一些新聞，但我不會刻意的去搜索。

講話人 1：也就是說，如果瀏覽到了，一不小心刷到了就會看一下的那種，是嗎？

講話人 2：對，我會留意一些。

講話人 1：好的，如果您有興趣您會用怎樣的方式去提高自己的環境知識？

講話人 2：我們教師職工可能會組織一些在週末課余時間或者寒暑假，會組織一些活動，比如說像植樹節，學校老師們肯定會去組織一些植樹的活動，像我們課余時間可能會組織一起去郊外，感受一下自然，比如說騎自行車出行這種低碳的行為。我們還是會做出一些保護環境的事情，參加一些活動。

講話人 1：我還想問一下，您的學校目前有沒有計劃要去參加綠色學校的評選？

講話人 2：應該是有計劃要參加。

講話人 1：也就是說這樣是不是也會給老師們施加一些壓力什麼的？

講話人 2：應該沒有，目前我們會在學校里增加一些綠化，加強學校的一些整潔方面。對學生和老師也有一個類似於問卷調查或者是簡單的學科考核，達到一定分數以上，才有資格評為綠色學校。

講話人 1：明白，那看來您學校還確實是對這個綠色學校是有所關注的。您會主動去參加一些有關環境保護的活動嗎？不僅僅是環境保護，也可以說是普通的一些環境活動，您會主動去參加嗎？如果這個活動辦的比較有意義想話我是會去的。

講話人 2：比方說像植樹活動，我就覺得會對環境造成比較好的一方面，有的活動它可能會空有噱頭，但是沒有實質性的作用，我們可能不會去參加。

講話人 1：好，明白了。您大概參加的這些活動都是學校舉辦的，還是說校外的會多一點？

講話人 2：我參加的可能是學校舉辦的多一點，比如說植樹，包括像貧困地區捐贈物資，因為這樣物資可以再利用，包括像學校會更推崇綠色出行，比方說少開私家車、多去坐地鐵、公共交通工具或者是騎自行車，這些都是學校鼓勵的。

講話人 1：如果是您本身，比如說就像您剛才說了，私家車這一方面，您是真的確定是會去這麼做，還是說偶爾會這麼做？

講話人 2：偶爾會這麼做，因為確實也比較遠。

講話人 1：我明白了，那您會覺得參加這些活動對您瞭解環境有幫助嗎？

講話人 2：會有一些，因為有時候會感覺到還是親近自然可能會更好一些。

講話人 1：好，學校會不會定期為老師和學生們舉辦一些環境活動?

講話人 2：可能不會定期，可能會偶爾的，有需要的話可能會組織一些活動，但是還是以教科書為主。

講話人 1：好的，我大概瞭解了，就從您自身而言，您會不會去主動做一些保護環境的事情?

講話人 2：我可能做的比較簡單，但是我會做比如說像那種嗯日常我要購買東西，可能現在用的那種塑料袋比較多，我可能會使用那種可降解的塑料袋，或者是這種紙袋，或者是我自行會佩戴那種帆布環保袋。對我個人來講，包括像私家車出行這件事，我也在考慮以後盡量換上新能源汽車，這樣可能會對環境更好一些。

講話人 1：您覺得你做的這些行為的目的是為了什麼?

講話人 2：現在因為大家都在提倡低碳出行，盡自己的努力保護環境。嗯。我覺得如果大家都這樣做的話，肯定會對環境有很有解決很大的問題。

講話人 1：肯定是覺得它是能夠解決一定的問題，對嗎?

講話人 2：對，你像比如說離我們身邊最近的就是現在鄭州市車輛限行的問題，像如果是單雙號限行就很明顯天空會藍很多，霧霾會減少很多。

講話人 1：好，我明白了，我還想大概瞭解一下。您是否會主動和您身邊的人去分享一些有用的環境信息?

講話人 2：這個可能很少會分享。

講話人 1：那具體為什麼不會去?

講話人 2：因為這還得是自己的意識，別人未必願意去聽我的。

講話人 1：好的，我明白了，我還有兩個問題想要問您，耽誤您一些時間，您覺得瞭解更多的環境知識，能否幫助您去做一些想要保護環境的事情?

講話人 2：應該會有幫助。

講話人 1：那具體可不可以分享一下原因?

講話人 2：比方說你像如果是保護環境，我覺得不管是對個人還是對下一代來講，都是有很大的幫助的。

講話人 1：也就是說是可以造福於後代。

講話人 2：這個是個很長遠的問題，我覺得。

講話人 1：對，確實，因為不可能說是短期之內就能夠看到收益，而且必須人要達到一定的意識，對吧?

講話人 2：對，包括現在很多企業也都在做低碳出行或者低碳包裝，那麼從最簡單的包裝來講，很多企業都有開始做環保的。

講話人 1：好的，我大概瞭解了。最後一個問題想問您，您認為瞭解更多的環境知識，是否能夠提高您的環境意識以及環境的行為？

講話人 2：這個肯定會的，我覺得包括像有時候看的一些些電影，或者是瞭解到的一些新聞，肯定都會讓大家突然意識到原來現在環境污染已經這麼嚴重了，我們可能在日常生活中沒有體現，但是確實是如果新聞或者媒體，包括一些電影多去宣傳這些事情，肯定是會對大家造成很大的感觸。

講話人 1：好的，我就您的這樣的信息有了一定的瞭解，非常感謝您能配合我的採訪，並且對我的研究給予的支持。感謝。

NG3: 自然科學老師

講話人 1：好。非常感謝您能接受本研究關於訪研究的調查，請允許我對本研究的採訪部分做一個簡單的介紹。本研究是對鄭州市的綠色學校和非綠色學校關於老師環境知識、環境意識以及環境行為的環境素養的調查評估，非常榮幸能請到來完成我們的採訪，謝謝。

講話人 2：好的，ok，好的。

講話人 1：我先對您的個人的信息做一個簡單的瞭解，我想問一下，您目前是哪一門學科的老師？

講話人 2：我目前是任教科學科。

講話人 1：是自然科學科目的老師是嗎？您目前是教了多長時間？

講話人 2：我教了 5 年科學課。

講話人 1：5 年左右，那您的一個學歷背景是什麼樣子的？

講話人 2：我是研究生學歷。

講話人 1：那我就是想瞭解一下，您在本科和研究生分別都學了什麼樣的專業？

講話人 2：我這邊學的是計算機。

講話人 1：好的，本科和研究生都是學的計算機專業是嗎？好的，謝謝。我想問一下，您在教自然科學之前，有沒有從事過其他科目的一個教學呢？

講話人 2：沒有。

講話人 1：您一畢業就是教自然科學，是嗎？是的。好的，我大概瞭解了，我想請問一下您有沒有接受過和環境教育或者是和環境知識比較相關的一些培訓？

講話人 2：基本上是在校內的是沒有。

講話人 1：的在校內是沒有的。您在之前或者是就是呃在您目前的生活當中，有沒有接受過這樣的一個教育?

講話人 2：會有一些公益活動，包括像一些少年宮這些會有一些公益的活動。可能像目前比較嚴重的國家在說水資源稀缺的一個問題，之後需要南水北調，處於中原的河南也是一個比較缺水的省份。所以現在都在提倡學生以及全社會都要做一個節水的一個活動，所以現在就屬於一個社會教育，包括一些網絡平台都會有這樣的活動、講座，我都會有一些瞭解。

講話人 1：您會參加的這些環境相關的培訓，以講座和活動為主，是嗎?

講話人 2:是的。

講話人 1: 好的，您目前所在的學校，會專門兒的為老師們去舉辦一些和環境教育相關的培訓嗎?

講話人 2：基本上是不會的。

講話人 1：那具體原因是什麼呢?

講話人 2：因為我大概也知道在在我們省也是會有綠色學校和非綠色學校的這樣一個劃分，就非綠色的學校來講，沒有一個硬性的指標要求，所以就不會積極的去做這樣的事情，也可能是整個教學的任務也是比較繁重，所以基本上是很少會專門的去做這樣的一個活動。

講話人 1：好的，我大概瞭解了，我想問一下通過您參加的這些公益活動或者是您聽到的這些關於環境方面的講座，您覺得有用嗎。

講話人 2：我覺得還是非常有用的，如果要是說因為教育的話我覺得可以說是有學校教育和社會教育，尤其是學校教育，因為是小朋友成長過程當中吸取知識的一個很重要的途徑。如果要是在學校裡邊教授環境相關的知識，我覺得對於小朋友一個意識和行為的一個養成是很有幫助的。

講話人 1：好的，我剛才聽您提到了，您覺得這個環境教育是非常有用的，那在您參加的這些公益活動或者是有聽到了這麼多的講座當中，有沒有哪一個內容就是跟環境有關的內容是讓您印象比較深刻的?

講話人 2：讓我印象比較深刻的其實就是中國之前在蒙古或者是邊界的地區，土壤沙化，之後非常嚴重。之後導致很多年的沙塵暴。因為我之前在北京生活的時候也是經歷過沙塵暴，這個污染的確是非常嚴重，後來之後可以界定到 pm2.5 之後又不斷地去治理和環境保護，才讓它這個現象有所改善的。

講話人 1：好，我大概瞭解了，其實您對環境知識或者是環境教育這方面的瞭解還是非常豐富的，我想繼續瞭解一下您的一個課堂上的一些安排。因為您剛才說到了您對

綠色學校和非綠色學校都還是有一定的瞭解的，我想問一下作為自然科學的老師，您會主動將您的環境知識融入到課堂當中嗎?

講話人 2：就我個人來講我會有這樣的一個考量的，但是學校是沒有一個專門的要求的。像我呢，現在因為我們剛剛好講到水的這一部分，之後我們學科今年也有會講到一個水的知識，所以我就會在課堂上把我們國家整體水資源的一個狀況對學生進行一個介紹，通過一些視頻、短片或者一些 ppt，反正一些比較可視化的一個內容傳輸給學生，讓他們建立一個呃自覺的、節約用水的一個意識。

講話人 1：您還會以怎樣的一種方式去教授環境相關的課程的？除了您剛剛提到的，會不會有一些比較新穎的方式會讓學生們更容易接受的?

講話人 2：那就基本不會了，因為現在科學課就作為學校裡邊比較重要的一個科目，它整個課業壓力還是比較大的。但是學校也會偶爾有一些像創意手工的活動，在這個活動中我就會積極的鼓勵學生去廢物利用的去創造一些比較新穎的，像一些花燈什麼的。我希望他們是用身邊的廢棄、不用的東西，後來進行一個創新型的一個設計、或者是改造。

講話人 1：我還想瞭解一下，您覺得學生是否可以通過自然科學課的內容學習到更多的環境知識?

講話人 2：其實我感覺我們現在這一版的教材裡邊是會有融入到一些環境教育的知識。所以在書本裡邊能夠學習到的知識，學生是可以學到的，而且他們在日常生活中是會用到的。

講話人 1：好的，我瞭解了，請問您這個課堂的安排，比如說您會不會主動地去針對環境方面的問題專門的安排一節課的內容去講解？或者說是學校有沒有這方面的要求?

講話人 2：這個目前是沒有的，因為確實是我們在學期之初就要把自己的正常的課程要安排妥當，而且現在因為疫情，有的時候又會影響到上課的進程，所以是主體的課程其實還跟起來還是很緊的，時間上很緊的，所以現在目前是沒有這樣的安排。

講話人 1：好的。還想問一下，您在生活當中會不會主動、自願的去瞭解一些環境知識，或者是多看一些與環境相關的文章?

講話人 2：其實我倒是還是對這方面還是挺希望去擴展一下這方面的知識，也是希望能夠做出一點自己的努力。文章的話看的不多，但是一些公益的節目之後是一些講座、推廣，還有一些公眾號方面的，我也會去瞭解一些。反正小文章會去瞭解，但是不會去學習專業的文章的。

講話人 1：如果您有這樣的一個興趣，您會用怎樣的方式去提高自己的環境知識?

講話人 2：其實我覺得環境知識和行為是相輔相成的，有的時候你可能在生活裡邊見到了，或者是涉及到這個東西了，你才會想去瞭解這個知識。所以我一般的時候呢都

是嗯有的時候是假如說看到了相關的廣告之後才去會去查一些類似背景的東西，學到一些知識。

講話人 1：那您對綠色學校是有一定的瞭解的，但是您現在目前所在的學校有沒有計劃要去參加綠色學校的評選?

講話人 2：據我所知，學校裡邊是有這樣的一個想法的，但可能現在是受到校園的規模的限制，所以還在考慮積極的改進。

講話人 1：好的。我還想再多瞭解一下，您會不會主動去參加一些有關環境的一些活動?

講話人 2：會的，如果要是像地球 1 小時這些活動，我都會積極參與，包括是低碳出行這些我都都很積極的去參與。

講話人 1：學校舉辦的活動或者是校外舉辦的活動是都會去參與的，是嗎?

講話人 2：是的，學校我更會積極參與，校外就根據個人時間，之後只要允許的情況下都會盡量參與。

講話人 1：好的，那您覺得參加這些活動是否真真正正能夠幫助您去瞭解到我們的環境?

講話人 2：我覺得是這樣的，一定會的，因為從在環境這一科這一個領域，其實很多人並不是真正的去知道這些知識的。

講話人 1：就是您現在目前所在的學校，如果有意想要去參加綠色學校的一個評選，他會不會定期為老師或者是為學生們舉辦一些有關環境方面的活動?

講話人 2：因為我有朋友在綠色學校，之後大致的就知道一下這樣的情況，他們就是呃他們綠色學校裡邊會有這樣的要求，之後會比較積極或者是頻次頻率比較高的去舉辦一些這樣的相關的活動。如果要是我們去申請成為綠色學校，我想學校也會積極的做一些這樣的準備和活動。

講話人 1：但是目前來說還是沒有說有一個頻率非常高的一個活動安排給老師和學生們，是嗎?

講話人 2：對，因為現在也是受疫情影響，課業壓力也比較大，所以還沒有完全進行正規化的一個教學模式。我覺得後面如果疫情結束了，我覺得會更好一些。

講話人 1：好的。在您平常的生活當中會不會主動去做一些保護環境的事情?

講話人 2：會的，現在像少用塑料袋減塑，之後少用吸管，包括有很多東西是重復利用，這些我覺得都是力所能及的事情都會去做的，少喝瓶裝水這樣的。

講話人 1：好的，那您覺得您做這些事情的目的是什麼？也就是我想瞭解一下，您覺得您做的這些事情，它可以幫助解決某哪些環境問題?

講話人 2：I 以我這個減塑為例，我覺得現在塑料產品的用量太大了，之後導致的白色垃圾呃白色污染太嚴重了，這是我覺得比較觸目驚心的，就很多地方甚至能看到這種塑料袋到處飛的這種情況。而且就我之前的這個知識，就是塑料是非常難以降解的一個東西，可能在地下數百年它都不會被腐蝕掉，所以我覺得這是一個很可怕的一件事。所以就我們來講，如果我們每個人所能做到的，那可能就是減少使用，就沒有辦法說是杜絕，或者是完全不用減少，是一個自己能夠做的、最切實可行的一個辦法。

講話人 1：好的，作為您自身而言，您會不會主動去和別人分享一下保護環境的這樣的一個行為，會不會去分享給其他人？

講話人 2：肯定是比較親密的人，像家人什麼就會多用購物袋少用塑料袋。學生我是非常樂於去影響他們的。

講話人 1：對的，您的保護環境的意識和行為還是非常好的。我還有最後兩個問題想要問一下，您覺得瞭解更多的環境知識，能否幫助您去想要做一些保護環境的事情呢？

講話人 2：我是有這樣的想法，因為目前在鄭州區域可能志願者相關的志願者並不是很多，我後邊我是打算參加相關的一個志願者的活動，之後去積極的做一些協助相關的像 NGO 或者是政府部門來去做一些活動。

講話人 1：好的。我還想最後瞭解一下，您認為目前瞭解更多的環境知識，是否能夠提高您的環境意識以及環境行為呢？

講話人 2：我覺得會的，因為你只有知道了這件事或者是知道了這個污染的危害或者破壞的危害了之後，你才會有意識的想要去做出改變。我覺得這其實是最源頭的，它會帶來一個你思想上的改變，之後從而讓你去在做各種判斷行動的時候，再去做出一些環保的行為。

講話人 1：好的，我對您的信息有一個大致的瞭解了，非常感謝您能夠參與本次的調查研究，謝謝。

講話人 2：那不客氣。

NG 4: 思想品德老師

講話人 1：首先非常感謝您能來做我本次研究的一個採訪的內容，先允許我簡單介紹一下本次採訪的目的。我的採訪目的是為了完成我對鄭州綠色學校和非綠色學校關於老師環境知識、環境意識以及環境行為的一個調查研究。非常感謝您能抽出寶貴的時間來對我的研究給予支持，謝謝。

講話人 2：你好。

講話人 1：hello，我先對您的背景做一個簡單的瞭解，那我就開始了。

講話人 2：好的。

講話人 1：好的。我想問一下您目前是哪一門學科的老師？

講話人 2：我目前是在教思想品德。

講話人 1：OK。那您大概教思想品德教了多長時間呢？

講話人 2：教了 5、6 年的時間。

講話人 1：5 到 6 年。好，ok，我方便問一下，您的學歷背景大概是什麼樣子的嗎？

講話人 2：我本科是讀漢語言文學的，碩士是哲學，所以我之前也教過語文，後來因為學校的一些安排，就現在教了思想品德。

講話人 1：ok，好的。那我就想大概問一下，您在教授語文課程的時候，教了多長時間？

講話人 2：教了也是 4 到 5 年的時間。

講話人 1：也就是說你是在不同的學校教的科目，是嗎？

講話人 2：對。

講話人 1：ok，那就是那您之前有沒有在綠色學校任教過？

講話人 2：沒有。

講話人 1：好的，我先做一個記錄，ok，好的，我還想問一下，您是否有接受過和環境教育或者是環境知識相關的培訓？

講話人 2：環境知識相關的培訓有接受過吧，但是很正式的環境教育沒有。

講話人 1：那可以瞭解一下，您接受的環境知識的培訓大概是以怎麼樣的一種形式進行的？

講話人 2：是以講座的形式。我之前有聽過幾個講座。

講話人 1：你這個講座大概是學校會邀請一些有關的那些環境保護方面的人士來進行的講座，是嗎？

講話人 2：是的，是一些專業人士分享一下專業知識。

講話人 1：ok，我大概瞭解了，那您現在所在的學校會不會專門為老師們舉辦一些關於環境教育相關的培訓？

講話人 2：我記得是有的，但是我沒有參加過，所以不太瞭解。

講話人 1：我方便問一下為什麼不參加嗎？

講話人 2：一個是比較忙，就是沒有時間。二是我本身也沒有特別感興趣，對這方面。對，所以就沒有去參加了。

講話人 1：您有大概瞭解過學校如果有相關課程和培訓的這樣的一個安排，時間上是怎麼安排的？就比如說他每個學期大概會安排多少次這樣的活動，或者說是每個星期這樣。

講話人 2：好像頻率不會太高，畢竟學生的學業挺繁忙的。對，就作為一個興趣這樣子的形式去開展。

講話人 1：ok，好的，謝謝。我想再瞭解一下，您覺得學習環境教育有沒有什麼用處？對於您的生活。

講話人 2：我覺得其實像保護環境這個也是意識上一個問題，我覺得意識還是很重要，可能你有了這個意識，你自然而然會有環境保護的一些行為。所以你說去學習環境教育有沒有一個很大的幫助？我覺得這也是也是看人。如果能改變的話，意識那肯定是有用，但如果他可能只是去片面的接受一些知識、一些教育也未必有用處，對，意識可能還是不會改變很大。

講話人 1：也就是說你其實覺得環境知識對你的影響並不大，重點是要看這個人有沒有這樣的一個意識，對嗎？

講話人 2：對，肯定是環境保護意識是才是最重要。ok ok。

講話人 1：我大概瞭解了，我就是想對於您平常上課的一些信息做一個基本的瞭解。您會不會就是您在上課的過程當中，會不會主動的將環境知識融入到您的課堂當中呢？

講話人 2：沒有。因為我是教思想品德，他是偏文科的一個科目，其實很難去引入到環境教育、環境保護方面的知識。對，所以我沒有試過。

講話人 1：ok，好的，我想問下，您有興趣去瞭解和環境知識有關的信息嗎？

講話人 2：其實我還是有些興趣的。對，但是沒有時間，所以也沒有很正式去學。

講話人 1：重點是沒有時間，而且因為您從事的這個職業是思想品德，沒有什麼實質性的用處。

講話人 2：我覺得可能理科和老師他們會更有需要去接受。

講話人 1：如果您有興趣去瞭解的話，大概您會用怎樣的形式去瞭解？

講話人 2：我覺得如果學校會舉辦些講座，或者是他有相關的一些課程，又是免費的，這樣子可能我們就會去聽一聽，畢竟也可以分享給身邊的人。

講話人 1：是說學校如果有這樣的要求就會去做？對嗎？

講話人 2：對，那當然 ok。

講話人 1：好，我還想再瞭解一下，您會有興趣去多參加一些關於環境保護或者是宣傳環境知識的活動嗎？

講話人 2：這個我要看情況，如果有機會的話也可以去參加一下、體驗一下。

講話人 1：如果您有興趣，你想參加類似於哪一類的活動呢？

講話人 2：我覺得可以去參加一些以戶外活動為主要形式的，可能在看一些比如說一些河流的一些保護，就能瞭解到河流是可以這麼保護，就切身的去走到那個地方，再去學習相關的知識，我覺得這樣可能會更生動一點。

講話人 1：好，您之前有沒有參加過一些類似於您說的這些的活動呢？

講話人 2：我沒有的，但是我知道是有的。對，只是我沒有去參加。

講話人 1：你們的學校會不會為老師和學生們專門提供一些類似於環境保護的活動？

講話人 2：會有的。

講話人 1：具體就是您覺得他們參加完這些活動以後，會不會有一個很大的收益？

講話人 2：我覺得學生應該還是蠻樂於參加這種活動的，因為是比較有趣，而且他可能是有別於我們課本的一些知識，他們會對一些新的東西、新事物比較好奇。

講話人 1：您會不會鼓勵學校去多舉辦類似的環境活動？

講話人 2：會，對，我覺得挺好的，因為對學生的一個環境保護意識也能有一個積極的影響。

講話人 1：好的。如果是您自己本身會有興趣或者是去主動做一些保護環境的事情嗎？

講話人 2：我就是力所能及的，比如說自己家裡面的垃圾就是分類去丟垃圾，支持一下垃圾分類、垃圾回收這樣子。

講話人 1：您覺得您做這些事情主要的目的是為了什麼？您比如說你剛才提到的是垃圾分類回收，它能夠解決目前存在的哪些的環境問題？

講話人 2：我覺得垃圾有效的分類、回收肯定是對環境保護有益處的，因為在有關的地方，他們處理這些東西的時候少了很多壓力，而且也不會亂去丟棄一些垃圾到一些不應該的地方，那就會對一些生物會有好的幫助。

講話人 1：好的，謝謝。還有最後一個問題想問您，您認為瞭解更多的環境知識，是否能夠提高您的環境意識以及保護環境的這樣的一個行為？

講話人 2：我覺得可以。

講話人 1：具體能不能說一下原因？就是在您的瞭解當中，您為什麼會覺得環境知識能夠提高您的意識和行為？

講話人 2：我覺得其實做很多事情都是意識能改變一個人的行為，對環境保護的話，你有了環境保護的意識，而且你瞭解了更多關於環境保護的一些具體做法，你的意識上就會有一個根本的改變，也就會影響到你生活的一些行為。

我就會覺得最終是會真的對環境保護有貢獻。所以我覺得意識是非常重要，你多瞭解就能促進你意識的提高。

講話人 1：好的，我非常感謝您能接受本次的採訪，在此我衷心的對您的參與表示一個感謝。謝謝。所以我們的採訪就到此結束。

講話人 2: 好，謝謝。

*講話人 1： 研究員

**講話人 2： 受訪者

Appendix 6

Approval letter for ethical review by HERC

香港教育大學
The Education University of Hong Kong

8 April 2021

Miss WEI Ran

Doctor of Education Programme

Graduate School

Dear Miss Wei,

Application for Ethical Review <Ref. no. 2020-2021-0300>

I am pleased to inform you that approval has been given by the Human Research Ethics Committee (HREC) for your research project:

Project title: A Study of the Impact of Vegetation and Green Schools on Students' and Teachers' Environmental Knowledge, Awareness, and Behaviours in Hong Kong and a Provincial City (Zhengzhou) on Mainland China

Ethical approval is granted for the project period from 8 April 2021 to 22 August 2021. If a project extension is applied for lasting more than 3 months, HREC should be contacted with information regarding the nature of and the reason for the extension. If any substantial changes have been made to the project, a new HREC application will be required.

Please note that you are responsible for informing the HREC in advance of any proposed substantive changes to the research proposal or procedures which may affect the validity of this ethical approval. You will receive separate notification should a fresh approval be required.

Thank you for your kind attention and we wish you well with your research.

Yours sincerely,

[redacted]

Patsy Chung (Ms)

Secretary
Human Research Ethics Committee

c.c. Professor CHOU Kee Lee, Chairperson, Human Research Ethics Committee

10 Lo Ping Road, Tai PO, New Territories, Hong Kong
T (852) 2948 8888 F (852) 2948 6000 www.eduhk.hk

香港新界大埔露屏路十號

Appendix 7

Consent Form and Information Sheet for Schools

THE EDUCATION UNIVERSITY OF HONG KONG

Science and Environmental Studies

CONSENT TO PARTICIPATE IN RESEARCH (FOR SCHOOL)

A Study of the Impact of Vegetation and Green Schools on Students' and Teachers' Environmental Knowledge, Awareness, and Behaviours in Hong Kong and a Provincial City (Zhengzhou) on Mainland China.

My school hereby consents to participate in the captioned project supervised by Principal Supervisor Dr. LI Wai Chin and conducted by Principal Investigator Wei Ran, who are staff / students of Department for Science and Environmental Studies in The Education University of Hong Kong.

I understand that information obtained from this research may be used in future research and may be published. However, our right to privacy will be retained, i.e., the personal details of my students'/teachers' will not be revealed.

The procedure as set out in the **attached** information sheet has been fully explained. I understand the benefits and risks involved. My students'/teachers' participation in the project are voluntary.

I acknowledge that we have the right to question any part of the procedure and can withdraw at any time without negative consequences.

Signature: _____

Name of Principal/Delegate*: _____ (Prof/Dr/Mr/Mrs/Ms/Miss*)

Post: _____

Name of School: _____

Date: _____

(please delete as appropriate)*

INFORMATION SHEET

A Study of the Impact of Vegetation and Green Schools on Students' and Teachers' Environmental Knowledge, Awareness, and Behaviours in Hong Kong and a Provincial City (Zhengzhou) on Mainland China.

Your school is invited to participate in a project supervised by Principal Supervisor Dr.LI Wai Chin and conducted by Principal Investigator Wei Ran, who are staff / students of Department for Science and Environmental Studies Department in The Education University of Hong Kong.

The introduction of the research

The purpose of this research is to promote the construction of green schools (primary schools) on mainland China through the development of the advantages of Hong Kong green schools (primary schools), and to prove that green schools can improve teachers' and students' environmental knowledge, environmental awareness and environmental behaviours through investigation and research. At the same time, the school's vegetation can effectively reduce the psychological pressure of students and improve their classroom performance.

The research objective of this study is set as primary schools, because the selected research cities in mainland China do not have a primary school that focuses on green schools, but the development of green primary schools in Hong Kong is at a leading level in the world. This research intends to use the research results to promote the development of green schools at primary schools on mainland China. Participants in this study are determined to be primary school students from grades 5^{th} - 6^{th}, ranging in age from 9 to 11 years old. This is to ensure that during the research process, the selected research subjects can fully understand the content of the questionnaire and avoid too many problems and misunderstandings to influence the research results.

The methodology of the research

A) Describe how many participants you will include in this study

Choose three primary schools in the objective city on mainland China, choose two grades of students from grades 5^{th} - 6^{th}, aged between 9-11 years old, and choose two classes in each grade, with 10 students in each class, including 5 male students and 5 female students, the total number of samples is 120.

It is also required to collect data from the three green schools and non-green schools in Hong Kong. The total number of samples is 240.

This research also needs to investigate the teachers in three green schools and three conventional schools in Hong Kong. Each school needs to select 8 teachers, 4 male teachers, and 4 female teachers. The total number of samples is 48. In each school, 1 male teacher and 1 female teacher are required to conduct interview surveys. The total number of samples is 12.

The data collection part of the objective cities in mainland China has been contacted by the local education bureau to three excellent primary schools to cooperate with the data collection after this research. Part of the data collection in Hong Kong requires the support and assistance of the principal supervisor to contact the local schools.

According to the requirements of data collection, the selected student groups only need to do the questionnaire survey. The selected teacher group needs to do the questionnaire survey, in which two teachers from each school randomly selected need to cooperate in completing the interview survey.

The data collection for the mainland part is scheduled for the school opening at March. 22-March. 26 in 2021and the data collection for the Hong Kong part is scheduled for April.12-April.19 in 2021.

The data collection plan of the two objective cities will take about one and a half months. For the questionnaire survey part, the answering time is about 30-40 minutes for the student part, 20-30 minutes for the teacher part, and the interview time for the teacher is limited to about 15 minutes. And the content of interview will be saved by audiotaped.

This study is very grateful to the participants for their support and help. After the questionnaire survey, the researcher prepared a small greeting card and a small handbook to present to the participants to express their gratitude.

The researcher guarantees that there will be no risks in this research, because this research is mainly in the form of questionnaires and interviews, and the questions are around the environment, which will not cause harm to the research subjects, and will not spread any harmful information. Participants are anonymous throughout the whole process, and the collected data will be properly stored. The researcher guarantees that it will not harm the benefits of the research groups and promises to protect the privacy of each participant.

The final purpose of this research is to complete the researcher's graduation thesis. The final thesis will be presented in the form of a lecture. If required later, it will be published in a journal.

If you would like to obtain more information about this study, please contact Wei Ran at telephone number [redacted] or their supervisor Dr.LI Wai Chin at telephone number 2948 8630.

If you have any concerns about the conduct of this research study, please do not hesitate to contact the Human Research Ethics Committee by email at hrec@eduhk.hk or by mail to Research and Development Office, The Education University of Hong Kong.

Thank you for your interest in participating in this study.

Wei Ran

Principal Investigator

香港教育大學

科學與環境教育學系

參與研究同意書(學校)

關於在香港和中國大陸的一個省會城市（鄭州）的綠色植被和綠色學校對學生和教師的環境知識，態度和行為的影響的研究。

本校同意參加由 首席監督員李偉展博士 負責監督, 首席研究員衛然 負責執行的研究計劃。她/他們是香港教育大學學生/教員。

本人理解此研究所獲得的資料可用於未來的研究和學術發表。然而本人有權保護本校學生/教師的隱私,其個人資料將不能洩漏。

研究者已將所附資料的有關步驟向本人作了充分的解釋。本人理解可能會出現的風險。本人是自願讓本校學生/教師參與這項研究。

本人理解本人及本校學生/教師皆有權在研究過程中提出問題,並在任何時候決定退出研究, 更不會因此而對研究工作產生的影響負有任何責任。

簽署: _____

校長/ 學校代表*姓名: _____ (教授/博士/先生/女士/小姐*)

職位: _____

學校名稱: _____

日期: _____

(**請刪去不適用者*)

香港教育大學

科學與環境教育學系

參與研究同意書(學校)

關於在香港和中國大陸的一個省會城市（鄭州）的綠色植被和綠色學校對學生和教師的環境知識，態度和行為的影響的研究。

誠邀 貴校參加 首席監督員李偉展博士 負責監督， 首席研究員衛然 負責執行的研究計劃。她/他們是香港教育大學學生/教員。

研究計劃簡介

本研究的目的是為了通過香港綠色學校（小學）的優勢發展來推動大陸綠色學校（小學）的建設，並通過調查研究來證明綠色學校可以提高老師以及學生的環境知識，環境意識以及環境行為， 同時學校的綠色表現能夠有效降低學生們的心裡壓力並提高學生們的課堂表現能力。

本研究的研究目標定為小學，因為所選的在大陸的研究城市當中並沒有一所以綠色學校為主題的小學，但香港的綠色小學發展在整個世界都屬於領先水平，希望通過研究能夠促進大陸的小學可以大力發展綠色學校的項目。參與者定為五年級到六年級的小學生，年齡在 9 歲到 11 歲，是為了確保研究過程中被選擇的研究對象能夠充分理解問卷調查的內容，避免過多的解釋影響研究結果。

研究方法

在大陸目標城市選擇三所小學，選擇 5-6 年級的兩個年級的學生，年齡在 9-11 歲之間，同時在每個年級選擇兩個班級，每個班級選擇 10 名學生，其中包括 5 名男同學以及 5 名女同學，樣本總數為 120.

同樣要求，在香港的三所綠色學校和非綠色學校當中進數據採集，樣本總數為 240.

本研究同時還需要對香港被選的三所綠色學校和三所普通學校當中的老師來進行調查研究，其中每個學校需要選擇 8 名老師，4 名男老師，4 名女老師，樣本總數為 48.其中每所學校當中需要有一名男老師以及一名女老師做採訪調查，樣本總數為 12.

在大陸目標城市的數據採集部分已經通過當地的教育局聯繫到三所優秀的小學來配合本研究之後的數據採集。在香港部分的數據採集，需要通過導師的支持和協助來聯繫當地的學校。

根據數據採集的要求，所選的學生群體只需要做問卷調查的內容。而所選的老師群體則　需要做問卷調查，其中隨機抽查的每個學校的兩名老師，還需要配合完成採訪調查。

大陸部分的數據收集安排在 2021 年的 3 月 22 日到 3 月 26 日进行，香港部分的數據採集

安排在 4 月 12 日到 4 月 19 日进行。

兩地的數據採集計劃需要一個半月左右的時間。問卷調查部分的問題回答時間，學生部分大概需要 30-40 分鐘，老師大概需要 20-30 分鐘，而針對老師的採訪時間則被控制在 15 分

鐘左右。所有采访内容将会被录音记录。本研究非常感謝參與者的支持和幫助，在問卷調查結束後，研究者準備了小賀卡和小手冊贈送給參與者，以此表示感謝。

研究者保證本研究不會存在風險，因本研究主要是以問卷調查形式和採訪形式為主，問題都是圍繞環境方面而言，並不會對研究對象造成傷害，也並不會傳播任何不利信息，參與者全程匿名，採集的數據會被妥善保存，研究者保證不傷害研究群體的利益並承諾保護每一個參與者的隱私安全。

本研究的最後目的是為了完成研究者的畢業論文，論文最後會將以演講的形式參與答辯，如後期有要求，會選擇在期刊中進行發表。

如閣下想獲得更多有關這項研究的資料，請電郵與本人 衛然 ([redacted]) 或本人的導師 李偉展(waichin@eduhk.hk) 聯絡。

如閣下對這項研究的操守有任何意見，可隨時與香港教育大學人類實驗對象操守委員會聯絡(電郵：hrec@eduhk.hk；地址：香港教育大學研究與發展事務處)。

謝謝閣下有興趣參與這項研究。

衛然

首席研究員

Appendix 8

Consent Form and Information Sheet for Teachers

THE EDUCATION UNIVERSITY OF HONG KONG

Science and Environmental Studies

CONSENT TO PARTICIPATE IN RESEARCH (FOR Teacher)

A Study of the Impact of Vegetation and Green Schools on Students' and Teachers' Environmental Knowledge, Awareness, and Behaviours in Hong Kong and a Provincial City (Zhengzhou) on Mainland China.

I hereby consent to participate in the captioned project supervised by Principal Supervisor Dr. LI Wai Chin and conducted by Principal Investigator Wei Ran, who are staff / students of Department for Science and Environmental Studies in The Education University of Hong Kong.

I understand that information obtained from this research may be used in future research and may be published. However, our right to privacy will be retained, i.e., the personal details of my students'/teachers' will not be revealed.

The procedure as set out in the **attached** information sheet has been fully explained. I understand the benefits and risks involved. My students'/teachers' participation in the project are voluntary.

I acknowledge that we have the right to question any part of the procedure and can withdraw at any time without negative consequences.

Signature: _____

Name of Teacher: _____ (Prof/Dr/Mr/Mrs/Ms/Miss*)

Post: _____

Name of School: _____

Date: _____

(please delete as appropriate)*

INFORMATION SHEET

A Study of the Impact of Vegetation and Green Schools on Students' and Teachers' Environmental Knowledge, Awareness, and Behaviours in Hong Kong and a Provincial City (Zhengzhou) on Mainland China.

You are invited to participate in a project supervised by Principal Supervisor Dr.LI Wai Chin and conducted by Principal Investigator Wei Ran, who are staff / students of Department for Science and Environmental Studies Department in The Education University of Hong Kong.

The introduction of the research

The purpose of this research is to promote the construction of green schools (primary schools) on mainland China through the development of the advantages of Hong Kong green schools (primary schools), and to prove that green schools can improve teachers' and students' environmental knowledge, environmental awareness and environmental behaviours through investigation and research. At the same time, the school's vegetation can effectively reduce the psychological pressure of students and improve their classroom performance.

The research objective of this study is set as primary schools, because the selected research cities in mainland China do not have a primary school that focuses on green schools, but the development of green primary schools in Hong Kong is at a leading level in the world. This research intends to use the research results to promote the development of green schools at primary schools on mainland China. Participants in this study are determined to be primary school students from grades 5^{th} - 6^{th}, ranging in age from 9 to 11 years old. This is to ensure that during the research process, the selected research subjects can fully understand the content of the questionnaire and avoid too many problems and misunderstandings to influence the research results.

The methodology of the research

Choose three primary schools in the objective city on mainland China, choose two grades of students from grades 5^{th} - 6^{th}, aged between 9-11 years old, and choose two classes in each grade, with 10 students in each class, including 5 male students and 5 female students, the total number of samples is 120.

It is also required to collect data from the three green schools and non-green schools in Hong Kong. The total number of samples is 240.

This research also needs to investigate the teachers in three green schools and three conventional schools in Hong Kong. Each school needs to select 8 teachers, 4 male teachers, and 4 female teachers. The total number of samples is 48. In each school, 1 male teacher and 1 female teacher are required to conduct interview surveys. The total number of samples is 12.

The data collection part of the objective cities in mainland China has been contacted by the local education bureau to three excellent primary schools to cooperate with the data collection after this research. Part of the data collection in Hong Kong requires the support and assistance of the principal supervisor to contact the local schools.

According to the requirements of data collection, the selected student groups only need to do the questionnaire survey. The selected teacher group needs to do the questionnaire survey, in which two teachers from each school randomly selected need to cooperate in completing the interview survey.

The data collection for the mainland part is scheduled for the school opening at March. 22-March. 26 in 2021and the data collection for the Hong Kong part is scheduled for April.12-April.19 in 2021.

The data collection plan of the two objective cities will take about one and a half months. For the questionnaire survey part, the answering time is about 30-40 minutes for the student part, 20-30 minutes for the teacher part, and the interview time for the teacher is limited to about 15 minutes. And the content of interview will be saved by audiotaped.

This study is very grateful to the participants for their support and help. After the questionnaire survey, the researcher prepared a small greeting card and a small handbook to present to the participants to express their gratitude.

The researcher guarantees that there will be no risks in this research, because this research is mainly in the form of questionnaires and interviews, and the questions are around the environment, which will not cause harm to the research subjects, and will not spread any harmful information. Participants are anonymous throughout the whole process, and the collected data will be properly stored. The researcher guarantees that it will not harm the benefits of the research groups and promises to protect the privacy of each participant.

The final purpose of this research is to complete the researcher's graduation thesis. The final thesis will be presented in the form of a lecture. If required later, it will be published in a journal.

If you would like to obtain more information about this study, please contact Wei Ran at telephone number [redacted] or their supervisor Dr.LI Wai Chin at telephone number 2948 8630.

If you have any concerns about the conduct of this research study, please do not hesitate to contact the Human Research Ethics Committee by email at hrec@eduhk.hk or by mail to Research and Development Office, The Education University of Hong Kong.

Thank you for your interest in participating in this study.

Wei Ran

Principal Investigator

香港教育大學

科學與環境教育學系

參與研究同意書(教師)

關於在香港和中國大陸的一個省會城市（鄭州）的綠色植被和綠色學校對學生和教師的環境知識，意識和行為的影響的研究。

本人同意參加由 首席監督員李偉展博士 負責監督, 首席研究員衛然 負責執行的研究計劃。她/他們是香港教育大學學生/教員。

本人理解此研究所獲得的資料可用於未來的研究和學術發表。然而本人有權保護本校學生/教師的隱私,其個人資料將不能洩漏。

研究者已將所附資料的有關步驟向本人作了充分的解釋。本人理解可能會出現的風險。本人是自願讓本校學生/教師參與這項研究。

本人理解本人及本校學生/教師皆有權在研究過程中提出問題,並在任何時候決定退出研究, 更不會因此而對研究工作產生的影響負有任何責任。

簽署: _____

教師姓名: _____ (教授/博士/先生/女士/小姐*)

職位: _____

學校名稱: _____

日期: _____

(**請刪去不適用者*)

香港教育大學

科學與環境教育學系

參與研究同意書(教師)

關於在香港中國大陸的一個省會城市（鄭州）的綠色植被和綠色學校對學生和教師的環境知識，意識和行為的影響的研究。

誠邀您參加 首席監督員李偉展博士 負責監督，首席研究員衛然 負責執行的研究計劃。她/他們是香港教育大學學生/教員。

研究計劃簡介

本研究的目的是為了通過香港綠色學校（小學）的優勢發展來推動大陸綠色學校（小學）的建設，並通過調查研究來證明綠色學校可以提高老師以及學生的環境知識，環境意識以及環境行為， 同時學校的綠色表現能夠有效降低學生們的心裡壓力並提高學生們的課堂表現能力。

本研究的研究目標定為小學，因為所選的在大陸的研究城市當中並沒有一所以綠色學校為主題的小學，但香港的綠色小學發展在整個世界都屬於領先水平，希望通過研究能夠促進大陸的小學可以大力發展綠色學校的項目。參與者定為五年級到六年級的小學生，年齡在 9 歲到 11 歲，是為了確保研究過程中被選擇的研究對象能夠充分理解問卷調查的內容，避免過多的解釋影響研究結果。

研究方法

在大陸目標城市選擇三所小學，選擇 5-6 年級的兩個年級的學生，年齡在 9-11 歲之間，同時在每個年級選擇兩個班級，每個班級選擇 10 名學生，其中包括 5 名男同學以及 5 名女同學，樣本總數為 120.

同樣要求，在香港的三所綠色學校和非綠色學校當中進數據採集，樣本總數為 240.

本研究同時還需要對香港被選的三所綠色學校和三所普通學校當中的老師來進行調查研究，其中每個學校需要選擇 8 名老師，4 名男老師，4 名女老師，樣本總數為 48.其中每所學校當中需要有一名男老師以及一名女老師做採訪調查，樣本總數為 12.

在大陸目標城市的數據採集部分已經通過當地的教育局聯繫到三所優秀的小學來配合本研究之後的數據採集。在香港部分的數據採集，需要通過導師的支持和協助來聯繫當地的學校。

根據數據採集的要求，所選的學生群體只需要做問卷調查的內容。而所選的老師群體則需要做問卷調查，其中隨機抽查的每個學校的兩名老師，還需要配合完成採訪調查。大陸部分的數據收集安排在 2021 年的 3 月 22 日到 3 月 26 日进行，香港部分的數據採

集安排在 4 月 12 日到 4 月 19 日进行。兩地的數據採集計劃需要一個半月左右的時間。問卷調查部分的問題回答時間，學生部分大概需要 30-40 分鐘，老師大概需要 20-30 分鐘，而針對老師的採訪時間則被控制在 15 分鐘左右。所有采访内容将会被录音记录。本研究非常感謝參與者的支持和幫助，在問卷調查結束後，研究者準備了小賀卡和小手冊贈送給參與者，以此表示感謝。研究者保證本研究不會存在風險，因本研究主要是以問卷調查形式和採訪形式为主，問題都是圍繞環境方面而言，並不會對研究對象造成傷害，也並不會傳播任何不利信息，參與者全程匿名，採集的數據會被妥善保存，研究者保證不傷害研究群體的利益並承諾保護每一個參與者的隱私安全。

本研究的最後目的是為了完成研究者的畢業論文，論文最後會將以演講的形式參與答辯，如後期有要求，會選擇在期刊中進行發表。

如閣下想獲得更多有關這項研究的資料，請電郵與本人 衛然 ([redacted]) 或本人的導師 李偉展(waichin@eduhk.hk) 聯絡。

如閣下對這項研究的操守有任何意見,可隨時與香港教育大學人類實驗對象操守委員會聯絡(電郵:hrec@eduhk.hk;地址:香港教育大學研究與發展事務處)。

謝謝閣下有興趣參與這項研究。

衛然

首席研究員

Appendix 9

Consent Form and Information Sheet for Parents

THE EDUCATION UNIVERSITY OF HONG KONG

Science and Environmental Studies

CONSENT TO PARTICIPATE IN RESEARCH

A Study of the Impact of Vegetation and Green Schools on Students' and Teachers' Environmental Knowledge, Awareness, and Behaviours in Hong Kong and a Provincial City (Zhengzhou) on Mainland China.

I _____ hereby consent to my child participating in the captioned research supervised by Principal Supervisor Dr.LI Wai Chin and conducted by Principal Investigator Wei Ran, who are staff / students of Department for Science and Environmental Studies in The Education University of Hong Kong.

I understand that information obtained from this research may be used in future research and may be published. However, our right to privacy will be retained, i.e., the personal details of my child will not be revealed.

The procedure as set out in the **attached** information sheet has been fully explained. I understand the benefits and risks involved. My child's participation in the project is voluntary.

I acknowledge that we have the right to question any part of the procedure and can withdraw at any time without negative consequences.

Name of participant _____

Signature of participant _____

Name of Parent or Guardian _____

Signature of Parent or Guardian _____

Date _____

INFORMATION SHEET

A Study of the Impact of Vegetation and Green Schools on Students' and Teachers' Environmental Knowledge, Awareness, and Behaviours in Hong Kong and a Provincial City (Zhengzhou) on Mainland China.

You are invited to participate with your child in a project supervised by Principal Supervisor Dr.LI Wai Chin and conducted by Principal Investigator Wei Ran, who are staff / students of the Department for Science and Environmental Studies in The Education University of Hong Kong.

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The purpose of this research is to promote the construction of green schools (primary schools) on mainland China through the development of the advantages of Hong Kong green schools (primary schools), and to prove that green schools can improve teachers' and students' environmental knowledge, environmental awareness and environmental behaviours through investigation and research. At the same time, the school's vegetation can effectively reduce the psychological pressure of students and improve their classroom performance.

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The methodology of the research

Choose three primary schools in the objective city on mainland China, choose two grades of students from grades 5^{th} - 6^{th}, aged between 9-11 years old, and choose two classes in each grade, with 10 students in each class, including 5 male students and 5 female students, the total number of samples is 120.

It is also required to collect data from the three green schools and non-green schools in Hong Kong. The total number of samples is 240.

This research also needs to investigate the teachers in three green schools and three conventional schools in Hong Kong. Each school needs to select 8 teachers, 4 male teachers, and 4 female teachers. The total number of samples is 48. In each school, 1 male teacher and 1 female teacher are required to conduct interview surveys. The total number of samples is 12.

The data collection part of the objective cities in mainland China has been contacted by the local education bureau to three excellent primary schools to cooperate with the data collection

after this research. Part of the data collection in Hong Kong requires the support and assistance of the principal supervisor to contact the local schools.

According to the requirements of data collection, the selected student groups only need to do the questionnaire survey. The selected teacher group needs to do the questionnaire survey, in which two teachers from each school randomly selected need to cooperate in completing the interview survey.

The data collection for the mainland part is scheduled for the school opening on March.22-March. 26 in 2021 and the data collection for the Hong Kong part is scheduled for April.12-April.19 in 2021.

The data collection plan of the two objective cities will take about one and a half months. For the questionnaire survey part, the answering time is about 30-40 minutes for the student part, 20-30 minutes for the teacher part, and the interview time for the teacher is limited to about 15 minutes. And the content of interview will be saved by audiotaped.

This study is very grateful to the participants for their support and help. After the questionnaire survey, the researcher prepared a small greeting card and a small handbook to present to the participants to express their gratitude.

The researcher guarantees that there will be no risks in this research, because this research is mainly in the form of questionnaires and interviews, and the questions are around the environment, which will not cause harm to the research subjects, and will not spread any harmful information. Participants are anonymous throughout the whole process, and the collected data will be properly stored. The researcher guarantees that it will not harm the benefits of the research groups and promises to protect the privacy of each participant.

The final purpose of this research is to complete the researcher's graduation thesis. The final thesis

will be presented in the form of a lecture. If required later, it will be published in a journal.

If you would like to obtain more information about this study, please contact Wei Ran at telephone number [redacted] or their supervisor Dr.LI Wai Chin at telephone number 2948 8630.

If you or your child have/ has any concerns about the conduct of this research study, please do not hesitate to contact the Human Research Ethics Committee by email at hrec@eduhk.hk or by mail to Research and Development Office, The Education University of Hong Kong.

Thank you for your interest in participating in this study.

Wei Ran

Principal Investigator

香港教育大學

科學與環境教育學系

參與研究同意書

關於在香港和中國大陸的一個省會城市（鄭州）的綠色植被和綠色學校對學生和教師的環境知識，意識和行為的影響的研究。

茲同意敝子弟_____參加由 首席監督員李偉展博士 負責監督, 首席研究員衛然 執行的研究項目。她/他們是香港教育大學科學與環境教育學系的學生/教員。

本人理解此研究所獲得的資料可用於未來的研究和學術發表。然而本人有權保護敝子弟的隱私,其個人資料將不能洩漏。

研究者已將所附資料的有關步驟向本人作了充分的解釋。本人理解可能會出現的風險。本人是自願讓敝子弟參與這項研究。

本人理解本人及敝子弟皆有權在研究過程中提出問題,並在任何時候決定退出研究, 更不會因此而對研究工作產生的影響負有任何責任。

參加者姓名: _____

參加者簽名: _____

父母姓名或監護人姓名: _____

父母或監護人簽名: _____

日期: _____

有關資料

關於在香港和中國大陸的一個省會城市（鄭州）的綠色植被和綠色學校對學生和教師的環境知識，意識和行為的影響的研究。

誠邀閣下及 貴子女參加 首席監督員李偉展博士 負責監督，首席研究員衛然 負責執行的研究計劃。她/他們是香港教育大學科學與環境教育學系的學生/教員。

研究計劃簡介

本研究的目的是為了通過香港綠色學校（小學）的優勢發展來推動大陸綠色學校（小學）的建設，並通過調查研究來證明綠色學校可以提高老師以及學生的環境知識，環境意識以及環境行為， 同時學校的綠色表現能夠有效降低學生們的心裡壓力並提高學生們的課堂表現能力。

本研究的研究目標定為小學，因為所選的在大陸的研究城市當中並沒有一所以綠色學校為主題的小學，但香港的綠色小學發展在整個世界都屬於領先水平，希望通過研究能夠促進大陸的小學可以大力發展綠色學校的項目。參與者定為五年級到六年級的小學生，年齡在 9 歲到 11 歲，是為了確保研究過程中被選擇的研究對象能夠充分理解問卷調查的內容，避免過多的解釋影響研究結果。

研究方法

在大陸目標城市選擇三所小學，選擇 5-6 年級的兩個年級的學生，年齡在 9-11 歲之間，同時在每個年級選擇兩個班級，每個班級選擇 10 名學生，其中包括 5 名男同學以及 5 名女同學，樣本總數為 120.

同樣要求，在香港的三所綠色學校和非綠色學校當中進數據採集，樣本總數為 240.

本研究同時還需要對香港被選的三所綠色學校和三所普通學校當中的老師來進行調查研究，其中每個學校需要選擇 8 名老師，4 名男老師，4 名女老師，樣本總數為 48.其中每所學校當中需要有一名男老師以及一名女老師做採訪調查，樣本總數為 12.

在大陸目標城市的數據採集部分已經通過當地的教育局聯繫到三所優秀的小學來配合本研究之後的數據採集。在香港部分的數據採集，需要通過導師的支持和協助來聯繫當地的學校。

根據數據採集的要求，所選的學生群體只需要做問卷調查的內容。而所選的老師群體則需要做問卷調查，其中隨機抽查的每個學校的兩名老師，還需要配合完成採訪調查。

大陸部分的數據收集安排在 2021 年的 3 月 22 日到 3 月 26 日进行，香港部分的數據採集安排在 4 月 12 日到 4 月 19 日进行。兩地的數據採集計劃需要一個半月左右的時間。問卷調查部分的問題回答時間，學生部分大概需要 30-40 分鐘，老師大概需要 20-30 分鐘，而針對老師的採訪時間則被控制在 15 分鐘左右。所有采访内容将会被录音记录。

本研究非常感謝參與者的支持和幫助，在問卷調查結束後，研究者準備了小賀卡和小手冊贈送給參與者，以此表示感謝。

研究者保證本研究不會存在風險，因本研究主要是以問卷調查形式和採訪形式為主，問題都是圍繞環境方面而言，並不會對研究對象造成傷害，也並不會傳播任何不利信息，參與者全程匿名，採集的數據會被妥善保存，研究者保證不傷害研究群體的利益並承諾保護每一個參與者的隱私安全

本研究的最後目的是為了完成研究者的畢業論文，論文最後會將以演講的形式參與答辯，如後期有要求，會選擇在期刊中進行發表。

如閣下想獲得更多有關這項研究的資料，請電郵與本人 衛然([redacted]) 或本人的導師 李偉展(waichin@eduhk.hk) 聯絡。

如閣下對這項研究的操守有任何意見，可隨時與香港教育大學人類實驗對象操守委員會聯絡(電郵：hrec@eduhk.hk；地址：香港教育大學研究與發展事務處)。

謝謝閣下有興趣參與這項研究。

衛然

首席研究員

Appendix 10

The Normality Test of Q-Q Pilot of the Mean Diagram

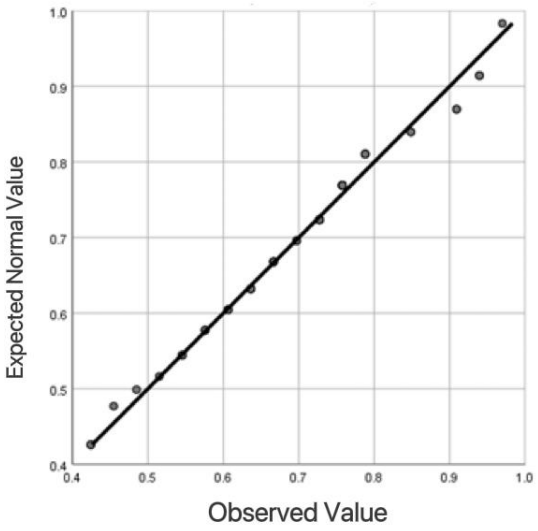

Figure 1. The normality test of teachers' environmental knowledge

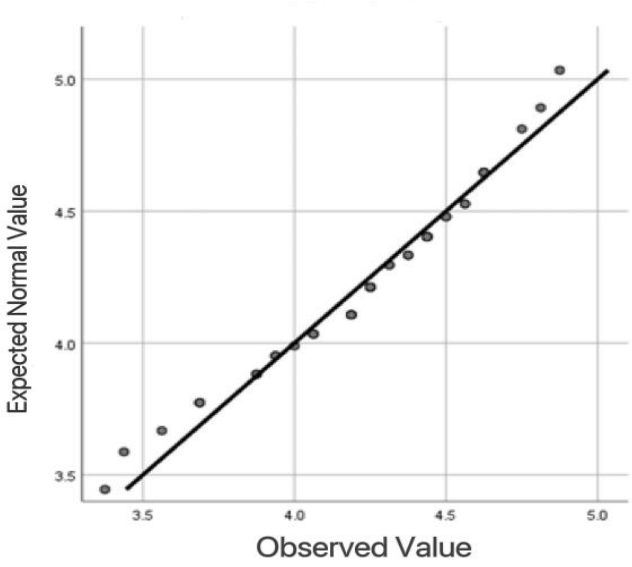

Figure 2. The normality test of teachers' environmental attitudes

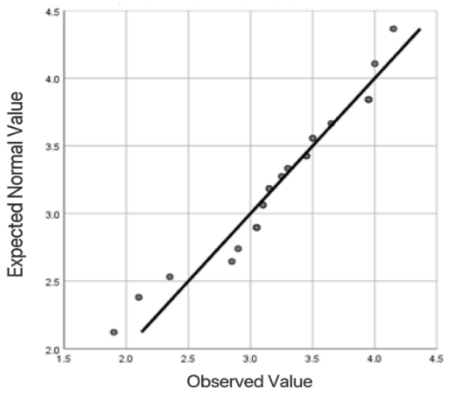

Figure 3. The normality test of teachers' environmental behaviours

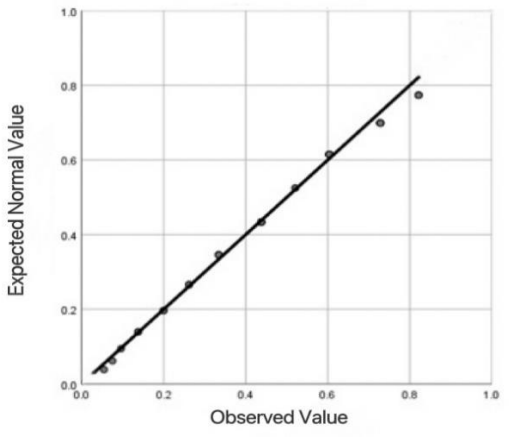

Figure 4. The normality test of students' environmental knowledge

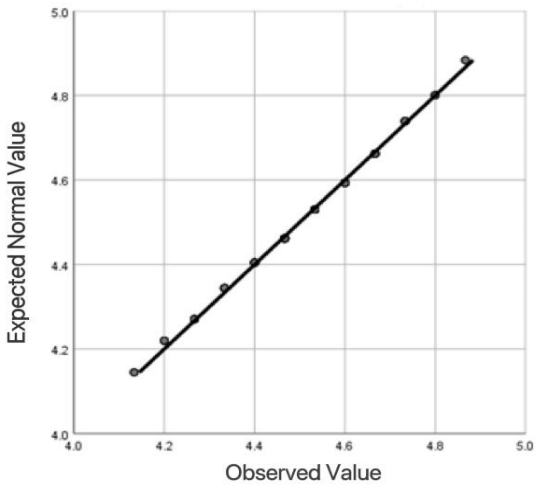

Figure5. The normality of students' environmental attitudes

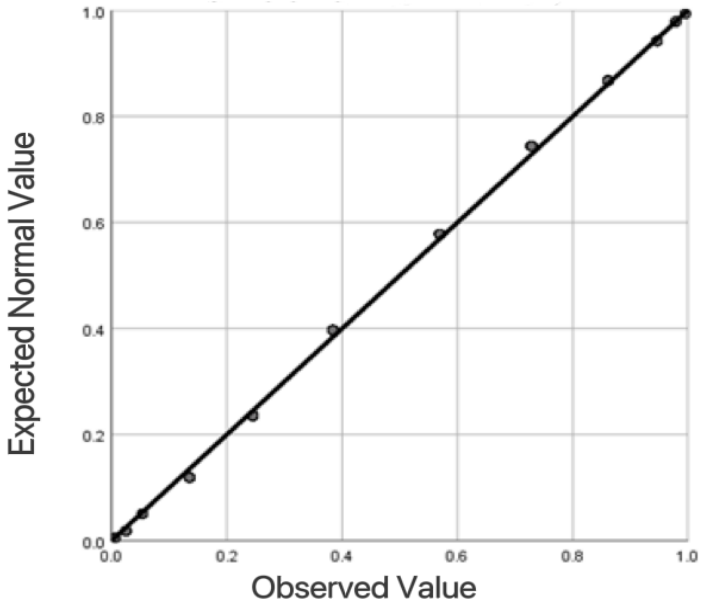

Figure 6. The normality test of students' environmental behaviours

Explanation: According to the statistical analysis of the data, if the points on the Q-Q diagram can be distributed in a straight line, it is approximately and accorded with the normality distribution. Therefore, from the above Q-Q pilot of the mean diagram, the points of the average scores of teachers' and students' environmental knowledge, environmental attitudes, and environmental behaviours can be evenly distributed in a straight line, and the trend is evident. Therefore, the continuous data can be considered to follow a normal distribution.