A Comparative Study on the Development Status of Environmental Education in the United States, the United Kingdom, and Australia

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Abstract. With the rapid development of the world economy, the global environment and development problems faced by mankind have become increasingly prominent. At the expense of the environment, people have created unprecedented material wealth and promoted the rapid development of the world's material civilization. This leads to environmental deterioration, resource consumption, and serious ecological destruction. The realization of environmentally sustainable development has become a major issue of common concern for all mankind. Environmental education is a comprehensive lifelong education with the relationship between humans and the environment as the core. According to agenda 21, "education is the decisive factor in implementing sustainable development strategies and empowering people to solve environmental and development problems. Educational behavior plays an important role in sustainable development. Its main purpose is to train people to consciously protect the environment and care for the environment by using education. Environmental protection is an important part of sustainable development, and environmental education is the decisive factor to realize environmental protection. It arouses citizens' awareness of environmental protection, improves the quality of the whole people's environmental protection, and finally realizes sustainable development. his paper makes a comparative study on the development status of environmental education in the United States, the United Kingdom, and Australia. By analyzing and discussing the current problems of environmental education, this paper tries to conclude the far-reaching significance of the future development of environmental education.

1. Introduction

In the past decade, with the rapid development of society and the widespread use of various technologies, the environmental problems in the past have become more prominent, and new environmental problems keep emerging. The main causes of environmental problems are as follows: first, the world population is increasing rapidly, which leads to the crisis of the human ecological environment. Second, people's excessive pursuit of economic growth leads to the emergence and deterioration of environmental problems. Thirdly, people have an insufficient understanding of environmental problems, and they think too much about environmental problems from the perspective
of local interests of the world. Many countries and regions have developed environmental policies before governance, which has exacerbated already serious environmental problems [1]. To change the current environmental situation and prevent further deterioration, governments should not only pay attention to environmental problems, but also strengthen management. To fundamentally solve environmental problems and effectively implement measures to protect the environment, it is necessary to raise the awareness of environmental protection and cultivate people's correct attitude towards the environment. Therefore, environmental education plays a key role [2]. (as shown in Figure 1).

![Figure 1: the pattern of sustainable development](image)

2. The development status of environmental education in the United States, the United Kingdom, and Australia

2.1 Environmental education in the United States

Among the environmental education in industrialized countries, the United States is a country that attaches more importance to environmental education. Besides establishing a formal education system and rich environmental education activities, the United States also attaches more importance to environmental education legislation. As early as 1970, the United States first promulgated environmental education law. Legalization is an important feature of environmental education in the United States, which marks that environmental education in the United States begins to move towards the track of rule of law. A sound institution is a strong guarantee for the smooth progress of environmental education in the United States. A stable and diversified investment mechanism provides a solid economic foundation for environmental education in the United States, which is also the key to the development of environmental education. In the United States, the teaching content of environmental education is rich, and innovation and uniqueness are the main channels of environmental education. The purpose of the legislation is to improve environmental quality and keep the ecological balance. The government provides subsidies for schools to set up environmental education courses, distributes textbooks and materials for use in environmental education activities nationwide, trains teachers, civil servants, communities, enterprises, and other personnel, and proposes plans for field ecological research centers. Besides, the United States provides educational programs for communities to protect and improve the quality and balance of the environment and prepares and addresses environmental and ecological issues through advocacy tools [3].
Table 1: skills to understand and articulate environmental issues (skills to analyses and investigate environmental issues)

| Grade level | Grade 1-4 | Grade 5-8 | Grade 9-12 |
|-------------|-----------|-----------|------------|
| Identify and investigate problems | Ability to identify and investigate local and community environmental issues | Able to leverage important and secondary resources, apply development research and analytical skills, and conduct environmental surveys from the ground up | Ability to use research and analysis skills to investigate local, national, and global issues |
| Analyze the results of the problem | Recognize that environmental problems are related to social phenomena and can explore the consequences of the problem | Ability to identify the results of specific environmental problems using knowledge of ecology and human processes and systems | Able to assess the impact of environmental changes, environmental conditions and environmental problems on humans and ecosystems |
| Identify and evaluate solutions and activity processes | Recognize that there are different solutions and approaches | Ability to identify and develop action strategies for specific problems | Be able to identify specific conditions, specific days, and develop action strategies that may be effective |
| Work openly, flexibly and creatively | Recognize the importance of forming ideas and absorbing the views of others | Ability to consider the role of assumptions and interpretations that influence one’s own and others’ conclusions about environmental issues | To study the rich connotation of environmental problems in the spirit of equality and openness |

2.2 Environmental education in American schools

In the late 1960s, environmental education in the United States began to take off. Since the 1990s, environmental education in the United States has developed rapidly, and the federal government has provided a strong guarantee in human resources, financial resources, and institutions. The United States is one of the first countries in the world to implement environmental education. In the 1990s, with the idea of sustainable development, environmental education in the United States turned to sustainable development, and the attention of environmental education was extended to the level of sustainable development of the human spirit, economy and society. In 1990, the United States Congress passed the national environmental education act 1990, which marked a new stage of environmental education in the United States. In 1993, the North American association of fine yellow education put forward the "national plan for excellence in environmental education". The main features of environmental education in the United States are the institutional guarantee, and the combination of classroom and non-classroom environmental education in education. Primary and secondary schools in the United States have a general level of difficulty in environmental education, and when it comes to high school, the contents of environmental education textbooks are more abundant. In addition to many textbooks on environmental protection, there are specialized companies in the United States that publish textbooks on environmental science [4]. The successful implementation and development of environmental education in the United States is inseparable from the joint development of many environmental education development plans by the United States government, environmental protection organizations and environmental associations. These development plans involve a wide range of areas, have a great impact and are highly targeted, and are carried out in combination with national conditions and local specific problems. Therefore, most of them have achieved good results and become an important force to promote the healthy development of environmental education in primary and secondary schools. According to the contents of the environmental education development plan, it can be roughly divided into the following categories: (1) plans concerning professional training; (2) plans concerning curriculum content and teaching method reform; and (3) plans concerning teaching resources. Environmental education in the United States increasingly emphasizes the localization of education, which can be said to be the two sides of the same coin with the community of ecological practice. Especially in ecologically damaged urban communities, such as the once-run-down industrial area of Detroit, eco-restoration initiatives can help lift community spirits and restore trust-based community
capital. These efforts to root in one place are part of a broader indigenous movement and sustainable cultural innovation.

2.3 The development of informal environmental education in the United States

Environmental education is considered to consist of formal environmental education and informal environmental education. Formal environmental education refers to all kinds of school environmental education from kindergarten to university. Informal environmental education refers to various forms of environmental education activities carried out outside schools by various government departments, social groups, civil institutions, and non-governmental organizations. The North American environmental education association, which developed the guidelines for the national program of excellence in environmental education in 1993, believes that non-formal education has a broad target audience. Another trend in environmental education in the United States is to try to apply systems thinking. Cloud Institute for Sustainability Education, founded in the 1990s, is one of the early public welfare organizations applying the idea of system theory. Jaimie Cloud, its founder, recommended to environmental educators the important role that systems theory can play in instructional design, organizational management, and mental model transformation (Cloud 2005). Crowder notes that if the common goal of educators is sustainability. Efforts at environmental education and sustainable education lead to the same goal, thus eliminating the trap of futility or powerlessness from people's mental models. Environmental education in the United States needs to rely on a large amount of knowledge produced in such fields as environmental studies. Therefore, the introduction of system theory/ecological thinking touches on the problem of how to break through the existing knowledge system and education system. The international community also seems to recognize the inherent contradictions of "sustainability", which is dominated by economic development. Sustainability goals are not just a simple sum of "green" components or a transformation of energy, planning, infrastructure, investment, etc. They are about an inclusive vision of sustainability, civic engagement, and democratic governance at the local level. The United States is a legal country, the law is the guarantee of its policy implementation, environmental education is no exception. With the continuous emergence of environmental problems, increasingly serious, the United States government recognized that an important cause of environmental degradation and the destruction of ecological balance, is to protect the environment and ecological balance of the education of citizens.

3. Environmental education in the United Kingdom

The United Kingdom is one of the representative countries in the world to carry out environmental education, and it is also one of the industrialized countries that pay more attention to environmental education. The United Kingdom has provided valuable experience to the world in both theoretical research and the practice of environmental education. British environmental education takes "Lucas model of environmental education" as the basic principle and theoretical framework of environmental education in primary and secondary schools.
Table 2: statistics on the annual development of green schools in the UK

| Year | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 |
|------|------|------|------|------|------|------|------|------|------|------|------|
| Number of registration | 63   | 151  | 362  | 760  | 1073 | 1376 | 1866 | 2636 | 4071 | 3394 | 4289 |
| Number of awards        | 18   | 31   | 62   | 102  | 166  | 236  | 306  | 426  | 508  | 675  | 747  |

Table 3: statistics on the development of various green schools in the UK

| Year | 2003/2004 | The kindergarten | Primary school | Middle school | other | A total of |
|------|-----------|------------------|----------------|---------------|-------|------------|
| Number of registration | 225       | 2420             | 691            | 76            | 3394     |
| Number of awards        | 56        | 489              | 103            | 27            | 675      |

3.1 Environmental education in British schools

"Education about the environment" is the initial stage, which teaches students the basic knowledge of the environment. The purpose of environmental education in British primary and secondary schools is to help students raise their fragmentary and accidental knowledge to a comprehensive understanding of the environmental system through various effective ways. It enables students to recognize and understand the interaction with the environment, natural processes, and human activities. The acquisition and understanding of these knowledges will help to develop students' appreciation of the environment, so that they are willing to care about and protect the environment [5].

"Through environmental education" means that students must participate in environmental activities that are conducive to improving environmental quality. The emphasis of "education for the environment" is to enable students to learn environmentally responsible attitudes and values by encouraging and guiding them to explore the relationship between individuals and the environment and between individuals and environmental issues. At the same time, the curriculum of environmental education in primary and secondary schools has been developing constantly. The selected materials should illustrate the principles and perspectives of the environment and be appropriate for the student's understanding. Meanwhile, the content is conducive to the development of students' skills, especially those investigated, applied and integrated. In recent years, some schools in the UK have selectively integrated environmental topics into a single curriculum, making it a separate area of study. "Lucas model" school environment education with education as a whole, the model in the process of environmental education pays attention to the ascension of the comprehensive quality, emphasis on students' knowledge and skills, pay more attention to the close link between school, society, family and cooperation, based on the school take maximum utility of the family and society. In the process of environmental education, British secondary schools pay more attention to develop students' awareness, understanding and skills of the environment through their own experience. British universities, multi-disciplinary colleges and other institutions of higher education have seen better development of courses involving environmental content. While developing research on environmental education in primary and secondary schools, the college of education has set up many compulsory courses related to environmental education. (as shown in Figure 2).
3.2 Informal environmental education in the United Kingdom

Thanks to the efforts of the mass media and various groups and institutions, the British people have reached a consensus on environmental issues. Educational television and broadcasting have made a notable contribution. Through news and other programs, especially some continuous reports and documentaries, father-in-law’s environmental awareness has been greatly enhanced. In addition, a variety of environmental topics have been developed by various institutions for evening classes and short-term training courses, which have increased interest in environmental studies. In short, improving environmental awareness and forming environmental quality has become one of the major needs of British society. With the joint attention and efforts of the department of education and science, local education authorities, organizations and people from all walks of life, environmental education in the United Kingdom has achieved a better development.

4. Environmental education in Australia

Australia is a country with a unique ecological environment and rich mineral resources. As one of the developed countries in Oceania, Australia also faces serious environmental problems. Environmental education in Australian schools has been highly valued and achieved good results since the 1970s. The so-called environmental education generally needs to achieve two levels of goals: first, from a distance, it should be able to make people fundamentally care about the well-being of human life; second, from a close perspective, we should be able to help people realize that they must make concessions to the complex environment for the immediate benefit, to establish relevant environmental beliefs. These two levels are consistent in the fundamental sense, but sometimes there will be some conflicts when people’s choices should be to focus on long-term development. However, achieving the goals of these two levels, the direct way is to gradually arouse the awareness and understanding of environmental issues in environmental education [6]. To achieve the goals of these two levels, school environmental education is the foundation, and many practices in-school environmental education in Australia are worth recommending. The Australian government’s efforts to make environmental education won the general approval and participation from all walks of life in the country, at present, the environmental education planning has become the basis of the school education, a good school environment education contribute to the formation of the environmental awareness of citizens have a good start, but also for the deep development of national environmental protection reserves a large number of talents.

As early as 50 million years ago, the Australian continent separated from other continents, and the surrounding ocean blocked its contact with other continents, forming its unique ecological and geographical environment. As a developed country, Australia has had several ecological crises in its development process under the control of profit motive and still has serious environmental problems.
such as foreign invasion and excessive use of resources. In this regard, after the 1970s, the Australian government raised the level of ecological environmental protection and construction to the level of national will and realized that the cultivation of national ecological consciousness is a prerequisite for environmental protection. Therefore, environmental education in schools in Australia has been highly valued and achieved good results [7].

4.1 environmental education in Australian School

In Australian courses, teachers and students are familiar with "education about the environment" and "education in the environment", but the activity effects of these two activities are not significant. The relatively new "education for the environment" is consistent with the concept and purpose of environmental education for workers in the world. Environmental education for middle school students mainly study the country the law to protect the natural environment, ecological environment, mainly including, legislation, education, social and economic development emphasis on social and economic development must be combined with the protection of the natural environment, education resources legislation, emphasis on minerals, forests, water, and land resources rational development, utilization and protection of the relationship between. Preservation legislative education and education in planning and protective legislation. Australia is a federal country, the school education plan is mainly made by the state education department, an environmental education plan is no exception, in Australia, there are many supporting environmental education service institutions also play an important role in environmental education, some are responsible for special committees, there are also some independent institutions. Environmental education in Australia has been developed since the 1970s. Environmental education exists in the form of natural learning and outdoor education. Australia's environmental education policy and curriculum focus on interdisciplinary, teaching of environmental values, critical thinking, and decision-making skills, the growing number of schools, community interactions, and experimental teaching in environmental problem-solving. Australia has a tradition of curriculum development based on schools, which has promoted the reform and development of education planning. Due to the differences in school education practices, the whole country has some difficulties in environmental education. The fundamental purpose of environmental learning is to develop awareness and understanding of natural and artificial environments and to develop sensitivity to those behaviours that maintain or damage the environment. Environmental learning is the synthesis of all kinds of knowledge and understanding and is a necessary prerequisite for environmental protection and improvement.

4.2 development strategies of school education and teacher training in Australia

Australia has devised various development strategies for environmental education in schools. Environmental education is organized around specialized geographic areas, topics, or skills. The most widely adopted environmental education strategy is the penetration method, the second strategy is the single-subject method, the third strategy is the case study through field investigation, and the fourth strategy is the problem solving and value clarification method. Environmental education in Australia has always adopted "education about the environment" and "education in the environment". In terms of teacher training, most of the training courses of the former involve environmental knowledge, while the latter is to lead the normal students to go out of the classroom and conduct outdoor learning and field investigation in the environment. Environmental education in Australia today is somewhat different from the above forms. Firstly, environmental education is an educational activity with the environment as the main object [8]. It involves not only relevant knowledge of various disciplines and experience in the real environment but also attitudes and values. Second, an important feature of environmental governance is its interdisciplinary nature, involving natural, social and cultural systems. Thirdly, environmental education should impart knowledge and skills suitable for solving practical environmental problems and cultivate an attitude of
active exploration. Fourth, a collaborative discussion is also an important means of teacher training in environmental education. Teacher training in Australia is divided into three parts: pre-teacher training, postgraduate level education, and in-service education. The greatest achievement of in-service teacher training is to train many primary and secondary school teachers in Australia in a short time. With the systematic development of school curriculum, school planning, teacher training planning, etc., the public has greatly improved the significance of the Australian environment, making people more and more aware of the importance and necessity of receiving environmental education [9,10].

![Figure 3: Key keywords in different time periods.](image)

5. Conclusion

In the long course of history, human beings have been using their wisdom to continuously explore ways to conquer and transform nature. In the 1970s, with the development of world environmental education, the world environmental education conference was held frequently, and various forms of environmental education were carried out one after another. In the 1960s, the curriculum design took specific subjects as the framework, while in the 1970s, it began to reflect the characteristics of diversity and comprehensiveness. Environmental education in the passing years focused on the natural environment, while environmental education in the 1970s included the public environment, social environment and humanistic environment in the teaching content. In the 1980s and 1990s, with the comprehensive promotion of environmental education, many countries and regions cooperated with the implementation of the international environmental education plan formulated by UNESCO and carried out a variety of educational activities [11,12]. The international environmental education program has helped many countries in the world to incorporate environmental education into their educational systems and to implement it into their educational plans, policies, and reforms. Human's understanding of environmental education has been expanded and improved both in time and space. Environmental education is expressed as life education, lifelong education, public education, value education, and the comprehensive education. No matter it is in the United States, in the United Kingdom, in Australia or other countries, environmental education is carried out for the benefit of the world, for the benefit of future generations. Environmental education is the decisive factor to realize environmental protection. It arouses citizens' awareness of environmental protection, improves the people's environmental protection quality, and finally realizes sustainable development.
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