RESEARCH ARTICLE

Challenges and Strategies in Implementing Nature Education through a Kindergarten School-based Curriculum: A Case Study in Jiangsu, China

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ABSTRACT

This study explores the challenges and strategies of implementing nature education through school-based programs in Jiangsu Province kindergartens. Interviews with teachers from five kindergartens revealed experiences of integrating natural resources into daily teaching. Results showed that nature education, though valued for promoting holistic child development, faces challenges like insufficient theoretical guidance, weak teamwork, and inconsistent parental support. Public kindergartens benefited from community support and resource integration, while private ones struggled with systematic planning. The study recommends enhancing teacher training, reinforcing collaboration, improving curriculum assessment, increasing parental involvement, and incorporating forest education concepts to boost nature-based learning. This study provides valuable insights through a comprehensive analysis of nature education in China at the local level, and provides strong support for the improvement of nature education practice by improving the quality of early childhood education through a multidisciplinary perspective.

Keywords: *Nature Education, Kindergarten Curriculum, Teacher Training, Curriculum Implementation*

INTRODUCTION

In recent years, the concept of nature education has gradually gained attention in the field of kindergarten education, and its status in China has gradually risen, especially at the current stage, when China advocates the construction of ecological civilization and attaches importance to early childhood education.

The concept of nature education occupies an important position in early childhood education. For example, the role of nature in learning is one of the core elements of Montessori's educational philosophy (Ozgen, 2023).

Nature education promotes children's interaction with nature, cultivates children's spirit of inquiry, and promotes children's continuous contact with nature. It is an important means to cultivate children's ecological awareness and live in harmony with the environment (García-González & Schenetti, 2022). It emphasizes promoting children's physical and mental development and environmental awareness, and cultivating children's ability to learn independently through direct interaction with the natural environment. Nature education promotes children's cognitive, emotional and physical development through exploratory activities. Well-designed outdoor learning programs play an important role in improving children's academic performance, social behavior and comprehensive abilities (Mirrahimi et al., 2011). The natural environment optimizes the learning experience by improving children's attention, self-discipline, interest in learning and

reducing stress (Kuo et al., 2019). Well-designed natural environments support the holistic development of children in key areas such as social-emotional, language, cognitive, and sensorimotor development (Craig et al., 2024)

Integrating nature-based education into school-based curriculum is gaining momentum in China's early childhood education community.

Problem Statement

Despite growing recognition of the benefits of nature-based education, there are still significant challenges to its systematic implementation in Chinese kindergartens. Specific implementation strategies vary widely between kindergartens and teachers, and the effectiveness of these strategies has not been fully evaluated (Torquati et al., 2013). Inadequate training of educators, unequal access to natural resources (Ernest, 2013), and inconsistent parental attitudes (Schaller, 2023) have hindered the sustained and high-quality implementation of nature-based education and limited children's learning experiences in natural environments. This is particularly true in the context of China's rapid urbanization and uneven distribution of educational resources (Huang & Zhang, 2019). Even in Jiangsu Province, China, an economically developed province with abundant educational resources, there are significant inconsistencies in curriculum design, resource integration, and implementation paths for nature-based education in public and private kindergartens. However, there is still a lack of systematic research on the educational practices related to integrating nature education into kindergarten school-based curriculum. Therefore, it is urgent to explore the challenges and improvement strategies faced by kindergartens in specific implementation through in-depth research and analysis to help kindergarten teachers overcome difficulties, better integrate nature education, and improve the effectiveness and sustainability of their educational practices.

Research Questions

1. How are natural resources currently integrated into kindergarten curricula in Jiangsu Province, China?
2. What are the challenges educators face when implementing nature education?
3. What strategies can be used to overcome these challenges to enhance the effectiveness of nature-based education?

Research Objectives

1. To identify the current practices and strategies used in integrating natural resources into kindergarten curricula in Jiangsu Province, China.
2. To evaluate the challenges and limitations faced by educators during the implementation of nature education.
3. To propose practicable recommendations to improve the integration of nature education into early childhood education settings.

METHOD

Research Design

To explore the experiences and perspectives of kindergarten teachers from five kindergartens in Jiangsu Province regarding the integration of natural resources into school-based curricula, this study employed a qualitative research approach that. Semi-structured interviews were conducted to allow flexibility in addressing participants based on a pre-designed question outline.

Participants

The participants included five kindergarten teachers from Jiangsu Province, China. The samples were chosen under multiple factors:

1. Diverse institutional backgrounds: The sample included two public teachers with long-term employment (A1), two public teachers with contract-based employment (A2), and one private kindergarten teacher (B).

2. Demographic diversity: Participants' backgrounds, including age, gender, and teaching experience, were taken into account. The participants ranged in age from 28 to 50 years old and included four female teachers and one male teacher. Their teaching experience varied, with two novice teachers recently graduating from early childhood education programs and three teachers in the early career maturity stage, having taught for six to ten years.

Data Collection Strategy

Data were collected with participants' informed consent, using a combination of audio recordings and written notes to ensure accuracy and completeness. The recorded interviews were transcribed into text to create a comprehensive dataset, which served as the foundation for systematic analysis.

Data Analysis

The study utilized thematic analysis to systematically process and code the collected data, aiming to identify recurring themes relevant to the research focus. Thematic analysis involved an iterative process of reading and re-reading the transcribed texts to identify meaningful patterns and extract key insights. Using an inductive approach, themes naturally emerged from the data, minimizing potential cognitive biases.

After identifying initial themes, they were reviewed, refined, and categorized into core areas: curriculum design, resource integration, evaluation methods, and implementation challenges. Throughout the analysis process, interview data were repeatedly compared and cross-verified to ensure consistency and minimize subjective bias. The results were synthesized into a coherent framework that highlighted key issues and practical insights identified during the study, culminating in a final report.

RESULTS

Summary of interview results

1. The kindergarten where A1 is located advocates nature education and focuses on the use of surrounding natural resources (such as solar terms and local cultural elements). By integrating project-based learning (PBL) into thematic exploration, the curriculum design focuses on integrating natural resources within the park and within 3 kilometers, especially combining the 24 solar terms with traditional Chinese culture, emphasizing the interactive experience between children and nature, aiming to cultivate children's interest in nature and cognitive ability.
2. The kindergarten where A2 is located takes "nature-friendly education" as the core, actively responds to the call of national policies, and is committed to building a nature education system with Chinese characteristics. The curriculum development incorporates Wuxi local cultural elements, but faces some difficulties in the implementation process, including lack of systematic theoretical support, imperfect team collaboration mechanism, and insufficient overall planning guidance, which has a negative impact on the effectiveness and sustainability of the curriculum.
3. The kindergarten where B is located is child-centered, emphasizes personalized education, and stimulates children's curiosity and thirst for knowledge through curriculum gamification and situational teaching. The kindergarten attaches great importance to the role of the family in education, has established an effective model of home-school co-education, regularly organizes parent-child activities (such as parent-child sports games, parent meetings), and promotes the all-round development of children by strengthening cooperation between families and kindergartens.

Analysis of interview results

1. There are significant differences in the models and designs of integrating nature education into kindergarten-based curriculum between public and private kindergartens.

Public kindergarten: Relying on the natural resources within the kindergarten and its surrounding area of 3 kilometers, activities are carried out in conjunction with traditional culture such as the twenty-four solar terms to enhance children's natural experience. As public kindergartens receive more social support (such as policy support, capital investment and community resource sharing), their natural resource integration is more systematic and planned.

Private kindergarten: Oriented by children's needs, it mainly integrates the natural resources in the park and allows children to experience nature in outdoor activities through diversified experiential activities. However, due to limited resources, although teachers have the awareness of utilizing natural resources, there is a lack of systematic planning and long-term resource development strategies in actual implementation, resulting in insufficient depth and continuity of activity content.

2. Both public and private kindergartens focus on diversified evaluation methods, and the evaluation subjects and forms are rich and diverse, but there are common problems:

Diversified assessment methods include generative assessment and result-based assessment. Teachers upload case records through the APP to form children's growth files, recording children's development performance every two months. This process-based assessment focuses on recording the dynamic changes in children's individual development. Parents can understand their children's growth process in real time through the APP and participate in it. At the end of the semester, teachers evaluate children's development and give star ratings based on standards such as the "Guidelines for the Learning and Development of Children Aged 3-6" and the "Care and Education Manual" issued by the Ministry of Education of China. Parents can view evaluation results and provide feedback.

However, research has found that although assessment methods focus on individual children's development, systematic evaluation of curriculum quality and effectiveness is still lacking. In particular, there are deficiencies in the overall reflection and improvement of activities and projects, which makes it difficult to effectively judge the impact of the curriculum on children's long-term development and limits the improvement and optimization of curriculum quality.

DISCUSSION

Challenges

1. Limitations of teachers' professional abilities. Although teachers have a positive attitude towards nature education, they generally lack systematic theoretical guidance. In particular, teachers' theoretical knowledge and practical ability are obviously insufficient in how to effectively integrate natural resources into curriculum design.

2. Insufficient teamwork and resource sharing. Curriculum development and implementation rely heavily on the efforts of individual teachers, and teachers reflect the lack of a systematic collaboration mechanism and resource sharing platform. This limitation affects the consistency and coherence of curriculum implementation.

3. Limited parental support. Parents have different attitudes towards nature education. Some parents support outdoor activities, but some parents have concerns about the safety and educational significance of the activities. This inconsistency in attitudes limits the smooth implementation of nature education courses.

4. Insufficient curriculum quality assessment. The evaluation system of kindergartens mainly focuses on children's individual development, and lacks a systematic evaluation of the overall quality and effectiveness of the curriculum. This lack makes it difficult to effectively evaluate the impact of the curriculum on

children's long-term development and hinders the improvement of curriculum quality.

Improvement strategies

To overcome these challenges, multiple forces need to be combined:

1. The education functional departments should formulate support policies to encourage kindergartens to regularly organize training on the theory and practice of nature education. These trainings should help teachers master the methods of natural resource integration, improve theoretical foundations, and master diversified teaching methods to implement nature education more effectively.
2. Kindergartens can introduce regular curriculum sharing sessions and collaboration mechanisms to encourage resource exchange and experience sharing among teachers. This will help strengthen teamwork and reduce the pressure on individual teachers alone.
3. Kindergarten teachers need to give full play to their subjective initiative, organize diversified activities, and enhance parents' understanding and participation in nature education. By improving parents' understanding of the significance of nature education, kindergartens can establish stronger home-school cooperation and increase parental support.
4. In addition, experts in the field of early childhood education should develop a comprehensive and easy-to-operate evaluation system that not only focuses on children's development process, but also evaluates the achievement of curriculum goals and educational effects, so as to introduce kindergarten curriculum quality evaluation and help front-line teachers adjust curriculum design in a timely manner to ensure that it effectively supports children's all-round development.

Insights from Forest School Practices

This study focuses on the challenges and strategies of integrating natural resources in kindergartens' curriculum. However, during the research process, it was found that many of the practices demonstrated by teachers in their actual educational strategies are highly consistent with the concept of "Forest School".

Forest School is an educational method that promotes children's all-round development through long-term and continuous natural experience (Blackwell, 2015). Its core concepts include: emphasizing deep interaction with the natural environment and establishing a long-term connection between children and nature through regular activities; being child-centered, respecting children's interests and needs, and encouraging their autonomy and spirit of exploration; and focusing on comprehensive development in many aspects, including cognitive, emotional, social and physical growth (Knight, 2016). These concepts are highly consistent with the teaching strategies of some kindergarten teachers in practice.

For example, public kindergartens regularly organize outdoor activities related to solar terms, such as planting trees in spring and picking in autumn. These activities focus on children's continuous experience in the natural environment, which is consistent with the "long-term" concept of Forest School. At the same time, the diversified exploration activities designed by teachers (such as observing insects, planting plants and building natural materials) emphasize child-centeredness, respect their interests and needs, and encourage their independent exploration and practice, which fully reflects the principle of "respecting children's autonomy" in the forest school concept. In addition, some kindergartens use game-based and situational teaching methods to make children's natural experience more attractive, which is consistent with the forest school's teaching model that focuses on practice and experience.

Despite this, the study found that many teachers have not yet clearly realized the connection between these strategies and the forest school concept, and even lack understanding of the relevant theories of the forest school. This lack of

knowledge reserve has led to a lack of systematicity and depth in natural education practice to a certain extent.

The concept of forest school can serve as a powerful supplement to current nature education practices, providing more systematic guidance for teachers, creating more opportunities for parental involvement. Based on this, this study recommends that the concept of forest school be systematically integrated into kindergarten teacher training. By improving teachers' theoretical knowledge and practical ability, help them to more consciously apply the core principles of forest school in curriculum design. At the same time, kindergartens can combine the characteristics of local natural resources, integrate the implementation framework of forest school, and develop natural education content with regional characteristics.

In addition, attention should be paid to home-school co-education, and parents' understanding and support of natural education should be strengthened through parent lectures and parent-child activities, so as to jointly promote children's development.

In short, incorporating the concept of forest school into kindergarten curriculum and teacher training can not only enrich the form and content of nature education, but also provide children with a deeper nature experience and promote their cognitive, emotional, social and physical development. This strategy provides a systematic solution for the implementation of nature education and opens up a new direction for the sustainable development of early childhood education.

CONCLUSION

This study investigated the challenges and strategies of implementing nature education in school-based curriculum in kindergartens in Jiangsu Province, China. Through semi-structured interviews with teachers from five public and private kindergartens, this study explored their experiences of integrating natural resources into daily teaching practices. The findings showed that while nature education is increasingly recognized in promoting the holistic development of children, challenges such as insufficient theoretical guidance, weak teamwork, and uneven parental support still exist. Public kindergartens have better resource integration due to community support, while private kindergartens have difficulties in system planning. Recommendations include strengthening teacher training, strengthening collaborative mechanisms, improving curriculum evaluation, and increasing parental involvement. The study also recommends integrating forest education concepts into the curriculum to promote effective nature-based learning.

The conclusions of this study highlight the importance of systematic support and structured training for educators to effectively implement nature education in early childhood settings. By combining successful global models such as forest education and focusing on community and parental participation, nature education can be optimized to promote the holistic development of children. Incorporating regional characteristics and establishing a cooperative mechanism between teachers and families is the key to overcoming current challenges, which will help promote the sustainable development of nature education and ultimately promote the quality of early childhood education in kindergartens.

ACKNOWLEDGEMENT

I would like to extend my heartfelt gratitude to Prof. Madya Dr. Mohd Nazri Abdul Rahman for his invaluable mentorship and constructive feedback throughout the course of this research. I am also profoundly grateful to the five kindergarten teachers who generously shared their time and insights, despite their demanding schedules. Their contributions have been instrumental in the success of this study. Finally, I wish to acknowledge the support of all those who encouraged and inspired me throughout this journey, making this research possible.

DECLARATION OF POTENTIAL CONFLICT OF INTEREST

Jie Zhang does not work for, consult, own shares in, or receive funding from any company or organization that would benefit from this manuscript, and has disclosed no affiliations other than those noted above.

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