

Enhancing the Learning Environment in Kunming Kindergartens - A Comprehensive Review of Plant Landscape Design Strategies Aligned with Curriculum Standards

Ma Lulu^{1,2}, Adam Aruldewan S. Muthuveeran¹, Dai Na^{1,3},
Azmiyah Abd Ghafar¹, Gao Yuxuan¹, Ma Yali¹

¹Department of Landscape Architecture, Faculty of Design and Architecture, University Putra Malaysia, Serdang, 43400, MALAYSIA, ²School of Art and Design, Guangxi Science & Technology Normal University, No. 170 Junwu Road, Shatang Town, Liubei District, Liuzhou City, 545004, CHINA, ³School of Art, Sichuan Tourism University, No. 459, Hong ling Road, Long Quan Yi District, Chengdu 610100, CHINA
Corresponding Author Email: aruldewan@upm.edu.my

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Abstract

This research aims to integrate kindergarten botanical landscape design with the Chinese kindergarten education curriculum, aiming to enhance the learning environment for Chinese children. Through a literature review, this study examines the educational areas that Chinese children need to be exposed to within the kindergarten education framework and the current application status of botanical landscapes in kindergartens. This helps establish an approach for incorporating kindergarten landscape design into early childhood education. The outcomes of this research will contribute to understanding the current application status of botanical landscapes in kindergartens, theories related to Chinese kindergarten curriculum development, and theories regarding the integration of the kindergarten curriculum and botanical configuration. Furthermore, it will propose suitable botanical landscape design strategies aligned with kindergarten curriculum education. This study contributes to the enhanced utilization of botanical landscapes in early childhood education settings, thereby improving the learning environment for Chinese children.

Keywords: Landscape Plants, Kindergarten, Children's Learning Environment

Introduction

In urban areas of China, children typically spend a significant portion of their time, roughly 10 hours a day, in kindergarten from ages 3 to 6. If kindergartens fail to provide opportunities for children to connect with nature, they may experience a prolonged lack of interaction with the natural world. This deficiency in exposure to nature can give rise to various psychological

challenges, such as feelings of loneliness, difficulty concentrating, and heightened stress levels (Weixia, 2021). Moreover, the absence of nature can harm children's physical and mental development (Haiyang, 2020).

The landscape design of kindergartens holds immense importance for nurturing children's growth. Integrating plant landscape design within the kindergarten curriculum can offer children more extensive and diverse natural experiences. This integration can stimulate their curiosity and creativity while promoting the holistic development of their physical and mental well-being.

As a result, studying how to incorporate kindergarten plant landscape design into the curriculum effectively becomes a critical endeavor in enhancing the learning environment. This study delves into the role of landscape plants in children's kindergartens by thoroughly reviewing relevant literature. It aims to consolidate the existing landscape plant utilization practices in kindergartens, thereby furnishing valuable theoretical insights to inform the design of landscape plants ideally suited for kindergarten settings.

Literature Review

Chinese Kindergarten Curriculum Standards

This section primarily elucidates the concept of kindergarten curriculum standards and conducts a comprehensive study of the evolution of the Chinese kindergarten education curriculum. The objective is to establish a robust foundation for developing landscape designs that seamlessly align with the kindergarten curriculum standards.

Curriculum Standards

Preschool curriculum standards encompass regulations and guidelines delineating the objectives and prerequisites for learning and development during the preschool phase, typically addressing children aged 3 to 6. They constitute a set of instructive documents and norms devised by educational authorities or pertinent institutions within early childhood education. These standards serve as navigational tools for educators and teachers in early childhood education, guaranteeing the provision of comprehensive, well-rounded, and precisely tailored instruction to foster the extensive growth of young children.

Preschool curriculum standards typically encompass a range of aspects, including but not limited to the following

- **Educational objectives:** These standards outline preschool education's overarching goals and developmental trajectory to nurture children's holistic competencies and individual growth.
- **Teaching content:** They specify the fundamental range and pivotal domains within preschool education, spanning language, mathematics, science, arts, physical education, and more.
- **Teaching Activities and Methods:** These standards provide organizational frameworks, methodologies, and resource selection for teaching activities, facilitating children's learning and exploratory endeavors.
- **Teaching Assessment:** They establish evaluation methodologies and criteria for appraising children's learning and development, facilitating monitoring of their educational progress and developmental status.
- **Learning Environment:** These standards concentrate on the educational milieu of preschools, encompassing aspects such as classroom arrangement, educational aids,

learning resources, and more, all contributing to creating an enriching learning atmosphere.

- **Collaboration with Families and Communities:** These standards underscore the importance of close cooperation between parents, communities, and schools, fostering a synergistic approach to supporting children's comprehensive growth.

The content and requisites of preschool curriculum standards vary by country, region, and educational framework. These standards are essential guidelines in educational practice, aiding preschool teachers and educators in devising and executing education plans tailored to children's unique attributes and requirements. This process facilitates their learning, development, and overall growth.

Curriculum in Kindergarten

Review the 1980s of China preschool education curriculum reform (Nengxiu, 2003), the logic of the kindergarten curriculum from "Teacher's Syllabus" to "Children's Syllabus" (Yang & Zeng, 2022), points out the kindergarten curriculum quality exploration and promotion (Jixia, 2021), from the perspective of cognitive science of kindergarten curriculum construction theory reflection (Lele, 2020). At the same time, curriculum leadership is the key to the curriculum construction and implementation of nature education parks (Luo & Xiao, 2020). The construction and performance of the permeable "woodland situation" curriculum in kindergarten are also proposed (Yan, 2023).

In the 1980s, 1990s, and 21st century, the process of curriculum reform in preschool education was a process of gradual improvement (Cao, 2003). Now it is emphasized to break the situation that the kindergarten curriculum deviates from the "children" outline, and children's real internal needs and logic should be considered in the aspects of curriculum objectives, curriculum content, curriculum implementation, and curriculum evaluation (Yang & Zeng, 2022). Constructing a kindergarten curriculum should reflect the essential reference, significance, and theoretical value of cognitive science for constructing a kindergarten's curriculum view and children's view (Lele, 2020). At the same time, nature education in kindergartens utilizes natural resources and interaction and organic integration between concepts (Luo & Xiao, 2020). Guided by the idea of being close to nature and emphasizing the organic relationship between individual development and environment, the "woodland situation" kindergarten curriculum takes nature, society, and culture as the fertile soil for children's life and healthy growth. It builds a practical environment for children's curriculum integrating content and process (Yan, 2023).

Considering the curriculum standards, the curriculum logic emphasizes the organic relationship between individual development and the environment. This is essential for constructing a natural education curriculum practice environment that integrates content and process.

Plant Landscape Design

In the mid-1980s, plant landscaping gained attention in modern parks in China. Plants' rich forms and color variations perfected the artistic composition of parks, bringing a natural atmosphere and a vibrant sense of vitality to urban parks (Xia, 2008). Since the 1990s, the goal of garden construction in China has been to create ecological gardens (Xue, 2008). The theme of the 1999 Kunming World Horticultural Exposition, "Man and Nature in the 21st Century," fully reflected this era's spirit (Xue, 2008). Shanghai's "Pearl Garden" design fully embodies ecological concepts, using plant landscaping to create a modern urban garden with

significant environmental benefits, serving as an excellent example of building ecological gardens (Xue, 2008).

Plant landscapes create beautiful and comfortable living environments and improve people's living conditions (Baochun, 2019). Due to environmental degradation and the recent Covid-19 pandemic lockdown, humans increasingly yearn to return to nature (Hassan et al. 2021). Although most continuous landscape gardens may appear green, green does not necessarily equate to ecological (Yifan, 2020). From an environmental perspective, natural communities are healthier and more vibrant than artificial ones (Xiaoting, 2015). Landscape designers should make greater use of native plants, rely on existing vegetation on sites, or establish frameworks to facilitate natural regeneration, all of which embody the ecological nature of planning and design (Xiangrong, 2016).

In China, the number of plant species used in landscaping green spaces does not exceed 200, with most garden plants being introduced from abroad. There are few cultivated native ornamental plants, and there is a tendency to prioritize foreign plants, resulting in landscapes that may look good but lack practicality (You, 2021). Plant landscaping should be people-oriented, starting from the actual needs of people and the specific conditions of the site, integrating ecological functions, site functions, aesthetic forms, and human culture (Ma Lu & Wang, 2011).

Due to the scarcity of urban land resources, the space in kindergartens is limited. Many kindergartens have only a few potted plants for their landscaping, with a single type of plant and a lack of seasonal varieties. Furthermore, the arrangement of plant color is also insufficient (Yu Junli, 2019). The presence of plant landscapes in the overall environment of kindergartens is lacking, making it challenging to bring out their positive value for children's physical and mental development (Yu, 2019). Most kindergarten outdoor areas predominantly use hard surfaces, with a lack of plant landscape design, resulting in a lack of vitality and liveliness in the overall kindergarten environment and fewer opportunities for children to interact with nature (Yu, 2019).

The use of plant species in kindergartens often relies on standard municipal landscaping plants, resulting in a limited variety of plants (Guangyi, 2022). There is also insufficient greenery in vertical and rooftop spaces and limited use of regionally characteristic plants, which affects the unity of plant landscapes and leads to the loss of the aesthetic function of plant landscapes (Yu, 2019).

Preschool children are active and curious, but the design of plant landscapes in kindergartens often overlooks the rules and characteristics of children's physical and emotional development. The arrangement of plants is too arbitrary, failing to stimulate children's interest in observing and exploring plants truly. The formalization of plant landscape design is prevalent without considering the age and characteristics of children and setting up corresponding plant landscape areas (Yu, 2019).

Plant landscapes have functions such as maintaining ecological balance, alleviating psychological stress, and beautifying the environment (Muthuveeran et al., 2021). For children, plant landscapes allow them to directly experience the beauty of natural life and provide them with more positive and enriching spiritual experiences and cognitive knowledge (You et al., 2020).

In summary, plant landscaping is significant in modern parks and kindergartens in China. It not only adds beauty to the environment but also brings ecological benefits and promotes the comprehensive development of children. In future planning and design, emphasis should

be placed on environmental principles and better integration of human and natural elements to create a better urban and educational environment.

The Application of Plants in Kindergartens

Rich (2007) has discussed the effects of exposure to natural stimuli, particularly plants, on cognition and emotion from the perspective of cognitive psychology. Ismail (2011) stated the relationship between landscape elements (natural and artificial) in playgrounds and the stimulation of children's motor skills in outdoor play activities. Nature observation and activities positively influence the cognitive and linguistic development of 4–6-year-old children and their awareness of living things (Karakaya, Bozkurt & Yilmaz, 2022). There is also a close relationship between the value of kindergarten planting activities and educational strategies (Yu, 2021). School landscape promotes the absorption and mastery of learning knowledge (Ali et al., 2020).

The landscape is vital in supporting learning and increasing people's attention to the learning environment (Ali et al., 2020). Exposure to natural stimuli, especially windows containing genuine content, enhances creative problem-solving (Lynn Rich, 2007). In a case study (Ismail, 2011), researchers evaluated the playground of four schools. They concluded that natural and artificial landscape elements in the outdoor environment could promote children's physical skills development. Naturalistic observation activities contribute to children's cognitive and language development, enhancing their perception of the natural world. This highlights the importance of natural learning in early childhood education and provides a practical direction for preschool education (Karakaya et al., 2022). These educational strategies use nursery farming to develop nature-related activities (Lu, 2021).

A study by Rich (2007) focused on exposure to natural stimuli, especially views of windows containing natural content, which can enhance creative problem-solving ability. However, the small sample size in some of the study's experiments may limit the generalizability of the findings. Another study (Ismail, 2011) is limited to the case study evaluation of the playground. Thus the representation of the research is considered weak. Another study by Karakaya et al. (2022) also focused on the short-term effects on children but did not fully assess the potential long-term effects of nature observation activities. In another study, (Lu, 2021) examined the nature of kindergarten planting, ignoring other characteristics. Additionally, Ali et al (2020) used observation and structured interviews but did not consider the opinions and feelings of students and teachers.

Hence, integrating plants into the early childhood curriculum, and introducing the influence of plants on early childhood education, including cognitive and language development and physical skill development, should be considered based on the life and attractiveness of the outdoor environment.

Methods for Integrating Plants

Regarding integrating curriculum education research in kindergarten plant landscape design, some scholars have preliminarily discussed its significance by focusing on the influence of plants on early childhood education and creativity (Rich, 2007). Natural landscape elements can be used to improve the development of their physical skills (Ismail, 2011). Therefore, focus can be given to the effects of plants on cognitive and language development in preschool children (Kaya et al., 2022) through activity characteristics and site functions in plant applications (Meilin et al., 2014).

However, these studies lack empirical research support, and there are no substantial practical results and evaluations to design the principles and methods of designing plant landscapes according to the purpose of curriculum education. In general, the research on combining curriculum education in plant landscape design in kindergartens in China is still relatively primary, so more theoretical discussion and experimental research are needed to improve the relevant theories. Globally, research on the combined curriculum in kindergarten plant landscape design is also explored and practiced, as shown in Table 1.

Table 1

Situation analysis in the US, Canada, Japan, UK

Nation	Situation Analysis	Project
United States	A complete set of curriculum guidelines has been established, and more breakthroughs have been made in researching plant landscape design in kindergarten combined with curriculum design.	"Project Learning Tree"
Canada	There is little research on integrating plant landscape design and curriculum, but there have been some successful projects.	"Green Schoolyards"
Japan	Plant landscape design and education have important ideas and practical research results.	
United Kingdom	The research focuses on how plant landscape design can promote the development of children's self-esteem, social skills, and cognitive ability.	"Wellies in the Woods"

Overall, each country has made different breakthroughs and contributions to the study of integrating curriculum in kindergarten botanical landscape design. The United States and Canada are more advanced in environmental education and curriculum design. Japan focuses on integrating botanical landscape design with young children's self-exploration, and the United Kingdom emphasizes developing young children's psychological and social skills through botanical landscape design. In general, there are specific differences in different countries, which can also provide inspiration to learn from the experiences and innovative ideas by observing the research practices of different countries and provide more references and support for new ideas and methods of integrating botanical landscape design with different curriculum areas in kindergartens in China.

The "Life is education" concept should be deeply applied to the kindergarten planting activities, such as using the natural corner of the classroom (Ping, 2022). Kindergarten planting activities should start from the reality of children, improve children's different living abilities from the perspective of thinking, observation, experience, and practice, and guide children to enhance their experience in planting activities (Mengjie, 2021). The implementation of the green concept in education includes environmental protection education and sustainable development education; on the other hand, it combines the two aspects that education respects the nature of students and conforms to the law of development, and carries out kindergarten planting activities based on the concept to explore its importance and practical value (Yu, 2020)

Mengjie (2021) has highlighted that kindergarten planting activities should start from children's reality, improve children's different life abilities from the perspectives of thinking,

observation, experience, and practice, and guide children to enhance their experience in planting activities. Zhu (2022) suggested that "life is education" should be deeply applied in kindergarten planting activities by using the natural corner of the class and taking a walk after dinner. Zhu (2020) also proposed that implementing green concepts in education includes, on the one hand, education on environmental protection and sustainable development. On the other hand, it refers to the combination of the two aspects of education that respect students' nature and conform to their development laws with the development of kindergarten planting activities based on the concept to discuss its importance and practical value.

However, Zhou (2021) only focused on the fact that kindergarten planting activities should start from children's reality and improve children's different life abilities from the perspectives of thinking, observation, experience, and practice, but ignored the adaptability of the selection of plants elements in kindergarten planting activities. Nonetheless, Zhu (2022) recommended the idea of using the natural corner of the class, taking a walk after dinner, and applying the idea of "life is education" in kindergarten planting activities, which failed to fully explore other factors in kindergarten planting activities that fit with "life is education." Meanwhile, Zhu (2020) has focused on applying "green education" to practical teaching but fails to fully elaborate on the scope of kindergarten education under the concept of green education.

To develop and utilize plant resources in the kindergarten curriculum, green education practices, innovative educational strategies, and planting activities should be the focus of early childhood curriculum education, and we should consider how to integrate landscape design into this aspect.

Conceptual Framework

This conceptual framework (see Figure 1) emphasizes the establishment of plant landscape design strategies in the context of early childhood education, aligning with kindergarten curriculum standards to enhance the learning environment for young children. The learning environment refers to the external conditions that influence learning, fostering learners' active construction of knowledge and developing capabilities (Longfei, 2010). Key factors influencing the learning environment include the physical, psychological, and social environment, learning resources, teaching methods, time management, and technological support. Integrating kindergarten landscape design with early childhood education provides young children a more enriched learning resource. Kindergarten plant landscape design can facilitate children's knowledge acquisition, cognitive and language development, and physical skills development. Furthermore, leveraging plant landscape design to stimulate children's interest in learning contributes to a positive mindset and emotions, aiding in more effective knowledge absorption.

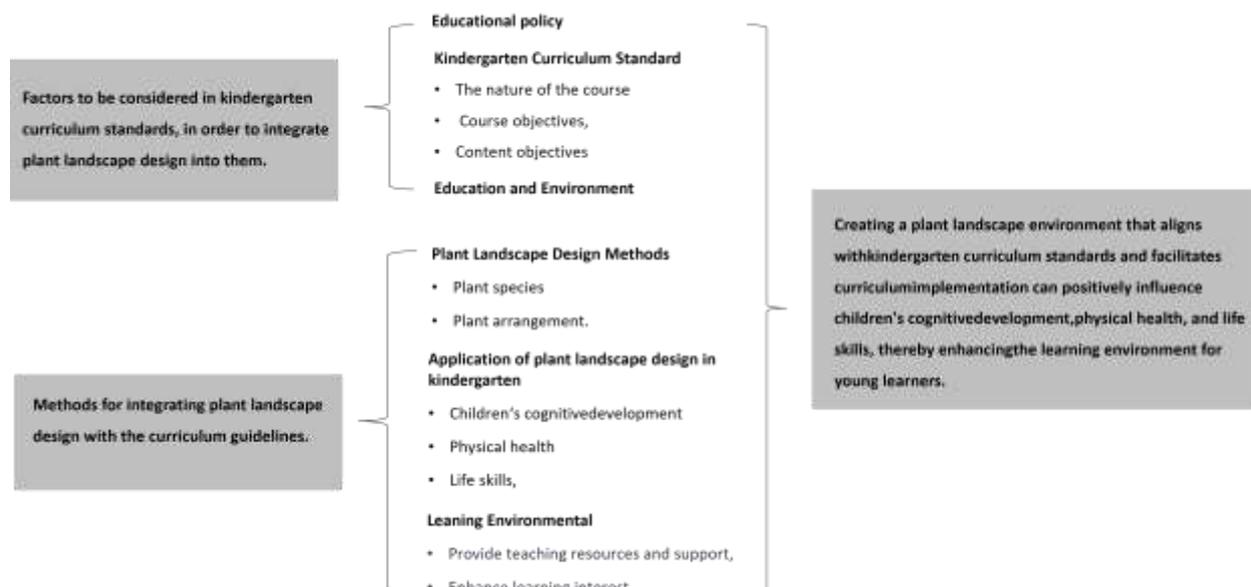


Figure 1 Conceptual Framework

Designing a plant landscape that enhances the learning environment for young children involves a fundamental consideration of alignment with kindergarten curriculum standards. By examining the requirements outlined in these standards for fostering early childhood development, we can identify the factors within the curriculum that allow for the integration of plant landscape design into the practical educational environment of a kindergarten.

Curriculum standards serve as guiding documents, outlining the nature of the curriculum, its objectives, content goals, and implementation recommendations for specific subjects. Subsequently, integrating plant landscape design with curriculum standards involves deliberately arranging and selecting plant species to create an aesthetically pleasing, functional, and sustainable outdoor environment.

Factors such as plant selection and arrangement within the plant landscape design must be carefully considered for their impact on early childhood education. This entails aligning with kindergarten educational needs by considering educational outcomes, physical health, emotional behaviors, and other aspects. The design should provide teaching resources and support, stimulate interests, promote learning, enhance physical well-being, and elevate life skills.

In summary, the design aims to synergize plant landscape considerations with the goals of kindergarten curriculum standards, enhancing the overall educational experience for young children through thoughtfully curated plant species, layout, and design elements. Therefore, to enhance the learning environment for young children through kindergarten plant landscape design, it is necessary to combine the foundation of kindergarten curriculum standards with consideration of the impact of plant landscape design on early childhood education. This involves devising feasible implementation strategies for plant landscape design that align with the curriculum standards suitable for the Kunming region in China. These strategies should consider the effects of implementation, learning outcomes, and educational experiences, followed by assessing their contribution to improving the learning environment.

Consequently, the approach comprehensively integrates plant landscape design principles with kindergarten curriculum standards, tailored explicitly to the Kunming area. It includes

thoroughly evaluating the implementation's effectiveness, learning achievements, educational experiences, and subsequent impact on the learning environment.

Conclusion

This study's systematic literature review synthesis process includes topics in the Chinese kindergarten education curriculum to configure landscape plants and improve the learning environment. The study considers the "Children's Syllabus" logic for the Chinese kindergarten education curriculum, emphasizing the organic relationship between individual development and the environment. Constructing a curriculum practice environment of nature education by integrating content and process is necessary. To configure landscape plants, the study found that to integrate plants into the early childhood curriculum, consideration should be focused on developing and utilizing plant resources' influence in early childhood education, including their cognitive, language, and physical skill development. To improve the learning environment, it was found that to realize the impact landscape design has on children's learning environment, and researchers should consider environments conducive to learning, physical health, improved life ability, and so on by selecting landscape plants suitable for the kindergarten curriculum. Further synthesis of the above results concludes that to integrate plants into the early childhood curriculum, it is necessary to consider their influence on learning, physical health, and life ability and construct a curriculum practice environment incorporating landscape design in the children's learning environment.

However, there are some gaps in this study. The literature review provides theoretical perspectives and insights. Still, it lacks specific empirical research and data to validate plants' actual effects and influences in early childhood education. It mainly focuses on the effects on cognition, language, and physical skills, overlooking the potential impacts of plant configuration on young children's emotional and social development. Although the importance of integrating plants into the early childhood curriculum and landscape design is mentioned, the literature review does not delve into the practical implementation of this integration to optimize the learning environment for young children.

Therefore, future research can focus on bridging these gaps by conducting more specific and empirical studies, thoroughly exploring the role of plants in early childhood education, and investigating strategies for integrating the educational curriculum with landscape design to promote the comprehensive development of young children.

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