Research on landscape design strategies and elements based on Environmental Education

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Abstract. Currently, global environmental issues are becoming increasingly severe, and people who have lived in cities for a long time have weak ecological awareness. With the strengthening of environmental awareness, people are beginning to realize the importance of contact and knowledge of nature. Environmental education has become an emerging industry in recent years with its breakthrough in the traditional education teaching practices. Environmental education has become an emerging industry in recent years with its breakthrough in traditional teaching practices. This article proposes some design strategies for landscape planning based on environmental education, and focuses on the design elements needed to carry out environmental education. The purpose is to integrate environmental education into the urban landscape in order to more effectively realize the sustainable development of the landscape, wake up and continue people's ecological consciousness.

Keywords: environmental education; landscape planning; design strategy; design element

1 Introduction

In recent years, the rapid development of information technology and the accelerated urbanization have brought more convenience to society. However, these have brought adverse effects on the ecological environment, including but not limited to global warming, marine pollution, soil erosion caused by the reduction of forested areas and the extinction of biological species. In addition to problems at the macro level of the ecological environment, people living in cities have begun to experience "nature deficit disorder" due to a lack of contact with nature, including psychological problems such as loss of interest in the surrounding environment, decreased perception ability and inattention. Therefore, it is urgent to improve people's ecological and environmental literacy. Environmental education can integrate ecological knowledge into practical activities to enhance people's environmental awareness. As a link between humans and nature, landscape design has been gradually emphasized in modern urban development and construction. Various types of green spaces such as suburban parks, community parks, and forest parks can fully showcase their own characteristics, create environmental education content with different themes, introduce environmental education

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knowledge into living spaces, and cultivate citizens' environmental awareness and environmental behavior.

2 Concept and significance

2.1 The Concept of Environmental Education

The origin of environmental education can be traced back to the Environmental Education Act promulgated in the United States in 1970, which stipulated that environmental education should focus on the natural and man made environment around human beings. That should be an educational process that understands various fields such as population, pollution, resource depletion, environmental protection, and urban-rural development plans from a human perspective. The Stockholm Conference on the Human Environment, held in 1972, formalized the official name of "environmental education", which clarified the meaning, nature and target groups of environmental education. This conference is the first to link environmental issues with social factors. Subsequently, environmental education began to be reflected in the work of governments around the world, gradually forming a global action on environmental education, becoming a common consciousness of countries around the world and a responsibility for all humanity.

Environmental education cannot be limited to explaining how the circular mechanism of nature operates, but rather encourages people to love and respect nature, enhances people's environmental awareness in the education process, and influences the improvement of current environmental problems and sustainable development in the future by increasing social participation. To strive to change the relationship between humans and nature and protect nature, it is necessary to recognize that human behavior is determined by the material foundation of its production, which has formed a social, economic, political, and institutional relationship in history. [1]

2.2 The significance of integrating environmental education into landscape design

Environmental education programmes normally focus on promoting environmental knowledge. Increasing knowledge is important, but it is not sufficient to solve the world’s environmental problems as it does not form a strong motivational basis for protecting nature like connectedness does.[2]An environment where outdoor activities can be carried out is a necessary condition for strengthening the connection between people and nature. It is reasonable to believe that courses that bring people into direct contact with the natural environment will have better educational outcomes than traditional indoor teaching activities. In addition to beautifying the urban environment, more importantly, landscape design can provide citizens with opportunities to get close to nature. These green areas are natural places for people to relax, which can effectively alleviate the pressure brought by work and life. However, the concept of environmental education and the educational elements of a single green space may be insufficient to lead people to spontaneously contact nature and learn about environmental issues.

Therefore, integrating environmental education concepts and activity planning into landscape planning is a combination of the advantages of the two, which can break through traditional books and classroom education, bring people to the real natural environment, so that they can get in touch with and understand nature on the way to travel. By conducting systematic and highly participatory outdoor experience courses, people's curiosity to explore the world will be met. This will enable people to have a proper understanding of how to get along with nature in order to achieve the ultimate goal of harmonious coexistence between human beings and nature.

3 Landscape Planning and Design Strategy Based on Environmental Education

3.1 Composite perception strategy

Human beings, as advanced organisms, differ from other inorganic, organic life forms and higher animals in that they are subjective and capable of consciously providing specific feedback to the external environment. Sight, hearing, touch, smell, and taste form the basis of human perception, these perceptual abilities not only satisfy the basic physiological needs for human survival, but more importantly, as a medium for human beings to connect with the outside world, they can bring people a deeper understanding and reflection on the basis of cognition in the fields of visual arts, music, and history.

Perception is the direct reflection of objective things in the mind through sensory stimulation. People receive comprehensive perception in the landscape space and re integrate the captured multifaceted information, so as to obtain a holistic understanding of their environment. In the planning and design of landscape with environmental education functions, in order to enrich the perception of experiences and mobilize the integration of sensory experiences, it is necessary to consider arranging spaces and devices within the site that can stimulate multiple senses. In addition, when people experience perception in a specific landscape space, there will be a dominant perception organ that play a leading role. Therefore, when constructing a natural educational environment, designing landscape elements that stimulate specific sensory organs, focusing on the landscape experience of specific sensory organs, and appropriately weakening the sensory experience of other sensory organs can effectively improve human perception depth. Therefore, when constructing a nature education environment, the depth of human perception can be effectively improved by designing landscape elements that stimulate specific sensory organs, focusing on the landscape experience of specific organs of perception, appropriately weakening the sensory experience of other organs.[3]

3.2 Interactive experience strategy

Interactive experience landscape emphasizes cognition and practice in nature. The creation of landscape space and the planning of activities need to be based on site conditions, and then nodes with different educational purposes and interactive scenarios are constructed according to the theme of the activity. The construction of interactive

scenarios needs to pay attention to the factors that influence the atmosphere of the event, such as the size of the event venue, the ratio of spatial atmosphere to the number of participants, and other design elements that directly affect the perception of the atmosphere of the interactive process, which can affect the frequency and quality of the perception process and interactive experience. [4]For example, Yosemite National Park in California, USA ,is famous for its majestic waterfalls and large-scale granite landforms. In addition to its magnificent natural scenery, the park offers a series of highly participatory and interesting experiential activities based on the features of the landforms, including hiking, cross country skiing, outdoor camping, and rock climbing. These activities allow people to come into contact with and learn about the nature during the journey to achieve the goal of environmental education.

Nature experience is an outdoor teaching method of environmental education, which can achieve the purpose of personal participation, cognition and reflection of the educated through practical thematic activities. In this process, people learn to understand and revere nature, thus forming natural values. In order to enhance people's experience in the environment, it is necessary to enhance the degree of the participation of learners in the landscape. Due to individual differences, the interaction between tourists and landscape elements, as well as the interaction between people has randomness. Therefore, when designing the environmental education landscape, the needs and practice preferences of tourists of different age levels need to be fully taken into account to create a space suitable for the behavioral patterns of different groups of people.

3.3 Environmental interpretation strategy

Environmental interpretation is one of the important links to achieve the function of environmental education, which first appeared in the service system of national parks in the United States. The types of interpretation can be divided into guided media and self-guided media based on whether there are personnel explaining. Guided media includes interpreters and a series of activities. Personnel interpretation is the most traditional form of environmental interpretation, in which specialized staff who have undergone professional pre-service training and have a wealth of experience in guided tours explain the environmental expertise to visitors in an enthusiastic manner. Since tourists can ask questions to the interpreters at any time during the trip, the interpretation program needs to ensure that the staff has a rich knowledge base and high professional quality.Self-guided media, also known as non-personal media, refers to any written, audio-visual, or photographic materials that can provide tourists with guidance, explanatory and educational content. Commonly used media include guidance manual, newspapers, interpretive boards, exhibition boards, and videos. With the advancement of technology, using emerging technological tools as the medium for interpretation may be the future development trend in the field of environmental interpretation.

The scientific and orderly construction of the environmental interpretation system must fully consider the key elements of environmental interpretation resources and audience. This is also an important component of the environmental interpretation equation proposed by the National Park Service in 1997, namely (resource knowledge+audience context) * environmental interpretation media=environmental interpretation

opportunities. [5]The fields covered by resource knowledge include zoology, botany, geography, astronomy, and meteorology. The audience of environmental education is the whole society. Before conducting landscape planning and design for an environmental education theme in a certain area, A comprehensive and detailed survey of the population in the area is needed as a basis for systematic planning and design of interpretive sessions. First of all, the subject of the interpretation and the focus of the content should be determined according to the characteristics of the population, including age, gender, income and hobbies. Secondly, set different forms of activities based on the educational theme content and the degree of resource protection.

4 Elements required for environmental education in landscape planning and design

4.1 physiognomy

Geological landforms in a region are the skeleton of landscape formation and the important part of tourism resources. Unique geological features are not only ornamental value, but also contain high educational value. Take China as an example, due to its vast land area, there are many geological and geomorphic types in China, including the karst landform in Zhangjiajie of Hunan Province, the Danxia landform in Longhu Mountain of Jiangxi Province, the Yadan landform in Dunhuang, and the canyon landform in the Yarlung Zangbo River. Geological education can help people understand the material composition of the earth, the structure and movement of the Earth's crust, and thus understand the geological phenomena of the earth such as volcanic eruptions, earthquakes, as well as the reasons for the formation of different landforms and laws. Being in a geomorphic environment will bring people more intuitively feelings about the extraordinary craftsmanship of nature, which will help people better understand the natural environment of the earth.

In addition to the geological and geomorphic features of the site itself, terrain design is also an indispensable part of landscape planning and design. The undulations of the terrain, as well as the openness and enclosure of space can bring people into the changing space, stimulate the vitality of the space and mobilize people's enthusiasm through changes in light, shadow, sound and color. Therefore, in the environmental education landscape, the existing terrain resources should be fully utilized to carry out educational activities.

4.2 Hydrologic Condition

The ancient Greek philosopher Thales believed that water was the source of everything. Water is the material foundation for the survival of all living organisms, it nourishes and cares for the ecological environment of the whole earth. The material that nurtures all living creatures also has delicate aesthetic significance. Water can not only combine with the surrounding environment to create a unique atmosphere, but also convey culture and emotion. Waterscape is an important element in landscape architecture design,

closely related to people. According to the human intuition, it can be divided into dynamic and static waterscapes. Dynamic waterscapes include waterfalls, streams, and rivers. Dynamic waterscapes are more dynamic and can enhance the interactive experience between tourists and waterscapes from multiple perspectives, including visual, auditory, and tactile aspects, thereby enhancing participants' landscape perception. There are also a large number of static waterscapes in the natural environment, such as ponds, swamps and lakes. Calm water features can provide visual stability to visitors and create an environment to calm people's emotions.

In summary, whether it is dynamic or static water, combined with other gardening elements such as architecture, animals, plants, or landscape structures, it will create different scenes and atmospheres. And due to the change of seasons, the same water environment will change with the surrounding environment at different times, which will create different scenes and bring people different feelings and interactive experiences from the perspective of multiple senses.

4.3 Plant species

Plants play a crucial role in nature, as they can achieve energy conversion, purify air, regulate climate, and maintain soil and water through photosynthesis. Plants are the main elements of natural landscape, they have high ornamental and scientific research value. In addition to beautifying the environment, the rich variety of plants can attract tourists' attention with their rich colors, odors, shapes, edible fruits. Environmental education activities can cultivate people's interest in exploring nature by explaining the growth process of plants through popularization of science and pairing it with perceptual experience. Therefore, plant cognition is one of the important parts of traditional environmental education, and the role of plants in the environmental education system is irreplaceable.

4.4 Paving and landscape sketches

Since the environmental education landscape is mostly in the natural environment rather than artificially developed and constructed sites, it is necessary to use safe paving materials and methods while designing the landscape without damaging the original ecological environment of the site. In order to maintain the original ecology of the site as much as possible and allow people to experience the most authentic nature. On this basis, the texture and color of the pavement can be designed and arranged according to the educational themes and perception needs of different functional areas to meet the conditions for creating different activities and spatial atmospheres. In the selection of materials for paving in some areas, materials with local characteristics can be selected, which can form a tourism space and natural texture with local characteristics. Taking Chengdu, Sichuan Province, China as an example, due to the abundant production of bamboo in Sichuan Province, Chengdu has adopted bamboo as a landscape element in many parks and urban green spaces within the city as the provincial capital and tourist city, such as road decoration, fences, leisure seats, and souvenirs. This creates a unique landscape element and cultural brand logo of Chengdu.

Although landscape sketches are not the necessary elements in landscape design, the existence of sketches can play a role in embellishing the space. Common sketches include sculptures, art installations, signs and seats. In the environmental education landscape planning and design, landscape sketches in addition to meet the basic functions of tourists viewing, rest and education, but also can add functions to interact with visitors in order to guide people to the perception of the experience.

5 Conclusion

In summary, integrating environmental education concepts into landscape design has two expected effects: on the one hand, it can ensure the ecological transformation of urban landscape, promote sustainable landscape development, and strengthen the connection between citizens and nature. On the other hand, through the popularization of natural resources to teach people the theory, and then the use of interactive activities and devices to stimulate people's senses, guiding visitors to spontaneously contact with nature to obtain novelty, interesting and impressive perceptual experience.

In addition, the planning of environmental education activities should consider the resources and environmental characteristics of the site itself, combined with the characteristics and behavioral preferences of the audience, in order to create a diversified natural education environment that meets the needs of environmental education participants.

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