

# Analysis of Plant Configuration and Landscaping in Campus Landscape Design Take a University as an Example

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## ABSTRACT

Plant configuration and landscaping are important components of college garden design and landscape construction, and are the combination of scientific configuration and artistic culture. Plants on campus are closely related to the daily life of teachers and students. This paper mainly investigates the development of campus environment and plant configuration, plant landscape layout, types of plant landscape configuration, and plant landscape design in a certain university, and finds that there are some problems in the current campus, such as unreasonable plant configuration, cultural taste to be improved, and insufficient plant post-treatment. By analyzing the existing plant types, levels of campus landscape, typical areas, such as the plant configuration in the green landscape in front of the boiling water room of a university, are analyzed and studied. On the basis of satisfying the aesthetic needs of teachers and students, the garden characteristics of university campus are summarized according to the principle of plant configuration and landscaping, and corresponding suggestions are put forward, and specific measures are discussed.

**Keywords:** *Campus environment, Plant configuration and landscaping, Landscape design.*

## 1. INTRODUCTION

With the rapid development of China's higher education and the continuous improvement of human society's awareness of the environmental landscape, people will pay more and more attention to the construction of university campus environment, and the culture and environmental education on campus will be paid more and more attention. The overall campus environment construction has been closely linked with its natural, social economy, historical and humanistic development and its own scientific research level. At the same time, it also requires the environmental quality of colleges and universities, so as to better realize the spiritual and visual feelings of teachers and students and experience a comfortable campus environment. This paper makes a theoretical summary of the related theories of environmental construction and plant landscape design and construction in colleges and universities.

**Social Economy** In the campus landscape of colleges and universities, there are many kinds of plants. Campus landscape should follow the design principles of plant

configuration and landscaping, and rationally configure the plants in campus landscape according to the growth habits of plants and the spatial layout of campus<sup>[1]</sup>. Through analyzing the types, frequencies and configuration levels of plants in the campus landscape of a university, the plants in the landscape are analyzed on the spot from different functional zones, so that the landscaping function of plants can be well displayed in the campus landscape design.

## 2. THE DEMAND OF PLANT ALLOCATION IN COLLEGES AND UNIVERSITIES

With people's demands and pursuits for life and their own environment, the requirements are getting higher and higher. Plants are one of the important elements in landscape design. At the same time, with the change of four seasons, plants show different appearances. In landscape design, plants can be used as the main or auxiliary scenery to set off. Plant landscape is also the most important part of the campus environment, and the scientific allocation of plants is paid more and more attention. The landscape design of university campus

gives it different functional areas. Such as leisure and entertainment areas, Interactive landscape design, fitness area landscape, etc. Therefore, due to the different functions given by its areas, the requirements and demands for the environment on campus are also different.

For example, in the entrance area of the campus, the solemn and quiet campus environment should be highlighted mainly by decoration; The trunk road chooses tree species with luxuriant foliage and large crown, which plays a role of shade. The environmental demand of the teaching area is quiet and fresh, which is suitable for planting some trees. However, the height of the plants and the distance from the teaching building should be well controlled, and both the plants themselves and indoor lighting should be considered. The living environment is comfortable, and the demand of plant configuration is to pay attention to the corresponding color matching and seasonal changes.

### **3. RESEARCH ON THE RELATIONSHIP BETWEEN PLANT CONFIGURATION AND LANDSCAPING IN COLLEGES AND UNIVERSITIES**

In the 16th-17th century, influenced by the Italian Renaissance, it was a regular garden. Later, due to the introduction of natural landscape gardens in China, the plant configuration changed from regular to natural, and gradually developed to modern gardens. Now, the plant configuration of modern gardens has begun to develop in a multi-style way. Plant allocation in modern landscape is mainly the overall balance of ecological environment, art and function that people pay attention to, while in modern landscape, art and ecology are symbiotic stages. No matter which aspect, it must conform to the ecological principle as the main premise [2]. Therefore, in order to realize the harmonious symbiosis in all aspects of plant allocation, the modern plant landscape is more and more inclined to nature, with more emphasis on the protection of natural vegetation to the ecological environment.

In the modern college campus, on the one hand, because of the frequent communication in the world, the communication and transmission speed of information is very fast. New ideas and forms from all over the world pervade every place, reflecting the present situation to people in time; On the other hand, it is mainly to retain the traditional culture of local campus to absorb nutrition, respect innovation, and take its essence to discard its dross [2].

According to the growth habits of plants as the basis of plant configuration, together with the designer's design idea of campus landscape and the stories of colleges and universities, the rational collocation of plants according to different design requirements is used to show the value of campus garden art [2]. When plant configuration is

carried out, it is necessary to have a comprehensive understanding of plants and then combine with the rocks in the garden to make a landscape. At the same time, attention should be paid to color collocation and morphological design collocation when making landscape art. Plants occupy an important position in landscape design [2]. First of all, plants can not only beautify the environment, but also use their own advantages to absorb harmful gases and improve the environment, which plays an important role in people's health. Secondly, it is to meet people's visual aesthetic and leisure time needs, which can make people feel completely relaxed and devote themselves to nature. In addition, through carefully designed and common sense plant configuration, the ecological environment of college gardens can play a certain protective role [1].

### **4. PRINCIPLES OF PLANT CONFIGURATION AND PLANT CONFIGURATION AND PLANT LANDSCAPING IN CAMPUS**

The campus is often dominated by evergreen trees, shrubs, bamboos, vines, flowers and plants when doing plant matching. The main principles to be followed in the process of plant matching are:

#### ***4.1. Principles Of Plant Configuration, Landscaping And Local Conditions Of Surrounding Environment***

Plants in campus landscape design should choose the principles of easy cultivation, easy pruning, wind protection and sand fixation. In choosing plants on campus, we should choose those that are easy to cultivate and feed, mainly considering the school's expenses before planting and the pruning and maintenance of plants in the later period after planting [3]; Moreover, plants that are easy to prune are mainly selected, and the main consideration is to reduce the cost of using follow-up staff and pruning work. Thirdly, the selection of wind-resistant and sand-fixing plants is mainly to consider the environmental sanitation of schools and reduce noise pollution; Water-resistant aquatic plants can be considered near the central water system of this university, but because of the serious pollution of water quality and the late school's untimely plant repair work.

#### ***4.2. The Plant Configuration And Landscaping Needs To Be Coordinated With The Surrounding Environment In The Campus Of Colleges And Universities.***

Generally speaking, regular and natural configurations are often adopted in choosing plant configurations and landscaping configurations. The Main plant allocation should be based on the shapes, manners,

characteristics and quantity of flowers and trees to get the best effect. The natural plant allocation is mainly based on the natural plant characteristics in nature. According to the changes of plants in nature, it emphasizes that the rational use of plants will bring people a vivid and lively feeling. This configuration mainly adopts the so-called unique configuration mode that people often adopt, that is, planting plants symmetrically on both sides of the visual center to form a stable pattern, and group planting is made up of a variety of arbor trees. The regular plant configuration is the use of symmetry and team arrangement, but the overall neat approach can bring people a solemn and solemn feeling [3].

**4.3. Seasonal Changes Of Plant Configuration And Landscaping**

The colors of flowers in different seasons will show people different visual effects and situations, and the seasonal changes of plants constitute different scenes in the four seasons of college campus, which can bring people different psychological feelings and form unique visual effects. In the plant landscape of colleges and universities, flowers should be used for color matching and embellishment, mainly considering the duration, size, color, variety and so on of flowers according to the overall environment. Every season, there will be different colors, and the variety of color changes and the diversity of landscape combinations. The configuration and landscaping should be clear and primary, and every effort should be made to have the feeling of spring all the year round in the campus, and all the scenery can be viewed [3].

**5. PRESENT SITUATION AND EXISTING PROBLEMS OF PLANT CONFIGURATION AND PLANT LANDSCAPING IN A UNIVERSITY CAMPUS**

**5.1. The Current Situation And Effect Of Plant Configuration And Landscaping In A University Campus**

The overall green coverage rate of a college campus is still relatively high, with a green area of about 370,000m<sup>2</sup>. The green space in the school is mainly composed of grass, trees and shrubs. Most of the campus landscapes are planted with some common garden plants, and the campus also includes an original ecological protection area and a built artificial water system [4]. The main campus landscape uses rice, crops, local weeds and easy-to-grow plants to create the campus environment atmosphere. Considering the campus culture as a whole, the landscape design style of a university campus is unique. The main landscape elements in the campus are the distinctive paddy field culture and local wild plants. The main landscape of colleges and universities is the

continuation of the original paddy field area, and then it is planned and divided according to colleges, so as to ensure its original ecological landscape; Secondly, each college can be responsible for a piece of land, so that students can experience the hard work of farmers.

The rice field landscape in colleges and universities mainly follows the design principle of respecting nature and conforming to nature, and mainly uses food crops such as northeast rice and buckwheat as the main landscape materials to create a modern and local rice field landscape. Its landscape adopts geometric grid design technique, and continues its inherent planning grid order.

**5.2. Problems In Plant Configuration And Landscaping In Colleges And Universities**

**5.2.1. The Allocation Of Plants On Campus Lacks Its Rationality**

**Table1.**Reference of horizontal spacing between trees and buildings and buildings

name	minimum spacing (m)	
	To arbor center	To the bush center
Exterior wall of windowed building	3.0	1.5
Exterior wall of windowless building	2.0	1.5
Road side aid, retaining wall foot, steep slope	1.0	0.5
pavement	0.75	0.5
Walls below 2m high	1.0	0.75
Walls more than 2m high	2.0	1
Center of columns and telephone poles of flyovers and trestles	2.0	Unlimited
Road signs, signs, billboards	1.2	1.2
Guard pavilion	3.0	2.0

There are many shortcomings in the plant configuration and plant landscaping of campus landscape design. When selecting tree species, because the seasonal changes including seasonal changes of tree species are not taken into account, the selection of tree species in campus landscape is relatively simple. In winter, the trees wither and the campus lacks aesthetic feeling.

On-the-spot investigation on the campus landscape design in colleges and universities shows that there are some problems and shortcomings. Only by carrying out various investigations and analysis can corresponding measures be taken to solve the problems, and the quality of the existing landscape design in colleges and universities can be by going up one flight of stairs.

Secondly, when the campus landscape is configured,

the color, shape and arrangement of high and low levels of plants are unreasonable; Thirdly, in plant allocation, the surrounding buildings are not fully taken into account, which causes certain damage to the plants themselves, as well as the lack of coordination and seasonality of the theme in landscape design. The lime characteristics of the buildings themselves have certain burn effects on the plants, so the distance between buildings and plants must be taken into account in the process of plant allocation, and the reference of trees, buildings and horizontal spacing between buildings shown in Table 1 has an impact on the aesthetic feeling of campus landscape to a certain extent.

*5.2.2. The Cultural Taste Of Campus Plant Configuration And Landscaping Needs To Be Improved*

Campus culture should be taken into consideration in plant configuration and landscaping, not by simply planting some flowers and trees, but by careful design, systematic, complex and patient work. Plant configuration and landscape design need to come from and be higher than nature, and combine the culture of college campus with people's demand for culture. However, in the process of campus landscape design, the plant landscape on campus lacks the characteristic culture of college campus.

*5.2.3. The Number Of Green Spaces On Campus Is Small, And The Humanized Design Is Insufficient.*

Campus environment mainly serves teachers and students, so that people's study and life can be close to nature and enjoy it. People-oriented in design. As shown in Figure 1, there is little green space in the square in front of the boiling water room of a university, tiles are broken and fall off, the traffic flow is large, the traffic flow lines are disorganized, students and teachers are allowed to flow freely, and the layout of green space is obviously insufficient, not just in this area, taking this area as an example [5].



**Figure 1** Square in front of the boiling water room

A large area of local rice fields has been preserved in

colleges and universities, and rice fields are regarded as a bright color in the campus. However, there are still some defects in the design, for example, overlooking the rice fields or watching the whole campus with unmanned aircraft will have amazing shocking effects. However, in the rice fields, there are no shade places for teachers and students to relax, and the hot weather in summer in winter will make those chairs only suitable for landscape. Because few people sit on them and there is no one to clean them up, it lacks their practicability. The varieties of plants are too local and monotonous [5], and the seasonality of rice fields is very strong. Except for a few months, most of the rice fields are deserted. The main reason for these defects is that rice does not bloom all the year round, but withers and is chaotic for a long time, so the large-scale application of rice has caused these problems.

*5.2.4. The Change Of Plant Configuration Level On Campus Is Insufficient And The Post-processing On Campus Is Not In Place.*

The middle and high-rise plants grow luxuriantly, which limits the light, water and humidity of the lower plants, resulting in the stunting of ground cover plants, and the loss in some areas of the school is open in the open air. In the same campus, with completely different vegetation, the campus landscape will inevitably have an abrupt feeling, and the transition with the surrounding landscape is unnatural. In the transformation, we should pay attention to the coordination with the original plants, deal with the original plants in the campus, clean up the poorly developed plants, and appropriately increase the plant varieties, so that the scientific plant allocation can be more artistic, rather than recreating the landscape.



**Figure 2** Landscape of a corner of college campus

As shown in Figure 2, due to poor repair in the later period, there are often rubbish in the green space, including the trampling of people in the back. In the later period, the landscape management and improper handling by the garden staff are all caused, including strengthening teachers' and students' awareness of environmental protection and environmental education and publicity, so as to improve the overall quality of teachers and students. The rubbish will cause corrosion and burns to plants, and the damage

to the ground is extremely serious, resulting in barren ground.

## 6.SOLUTIONS TO PLANT CONFIGURATION AND LANDSCAPING IN COLLEGES AND UNIVERSITIES

In order to effectively improve the environmental quality and create an environmental atmosphere in the university campus, we should follow the ecological type and use coordination and contrast<sup>[6]</sup>.in the transformation of the university campus, implement the principle of overall priority in plant configuration and landscaping, find out what problems exist in plant configuration and landscaping in the university campus according to the field investigation, and then put forward corresponding measures.

### 6.1. Improve The Dynamics And Balance Of Plant Allocation In Colleges And Universities

Due to the difference of plant growth habits and forms, the harmony between plants and natural environment must be fully considered <sup>[6]</sup>. In addition, because of the seasonal characteristics of flowers and plants, each season presents its own flourishing situation. Firstly, the most suitable plants for growing in Shenyang are selected according to the seasonal characteristics of Shenyang, and then the plants are allocated according to the seasonal characteristics to reduce the imbalance.



Figure 3 Renovation design of plane route of square in front of boiling water room

### 6.2. Enhance The Artistic Taste Of Campus Plant Configuration And Landscaping

With people's higher and higher demand for modern life and spirit, the design requirements for campus plant landscape are gradually increasing. In plant configuration and landscaping, the visual effect can be appropriately enhanced, and the layered artistic effect can be achieved by means of multi-level plant configuration<sup>[7]</sup>. As shown in the figure 3, through the design and planning of the landscape in front of the square of the boiling water room in colleges and universities, since the flow of people mainly comes from the library and the second canteen as the main auxiliary route, the water room is the main route to form a Y-shaped route, which facilitates the flow of

teachers and students and also regulates the flow route.



Figure 4 Reconstruction effect of square in front of boiling water room

As shown in Figure 4 the effect transformation diagram of the university's water room square uses the organic combination of trees, shrubs, green space and flowers. When matching plants, it needs to consider color and hierarchy, so as to achieve better visual effect and enhance better ornamental effect. When considering matching flowers, it needs to consider different flowering periods, and use hierarchical configuration to improve the ornamental period and artistic charm<sup>[8]</sup>. The artistic effect displayed in the campus landscape design can illuminate the cultural connotation and development of this campus.

### 6.3. Develop Vertical Greening And Increase Greening Space

Vertical greening is an important way to increase the greening area on campus, alleviate the large number of students, and reduce the per person green area and space landscape. It has a long-term development in campus greening in colleges and universities <sup>[8]</sup>. In the vertical greening of college campus, only the trellis greening is considered, such as the "grape trellis" on the Blue Dream Bridge in the campus, but it is also necessary to carry out greening on the vertical surface, such as the greening of walls, fences, balconies, roofs and other places. From this aspect, we can not only increase the greening area on campus, but also meet the greening needs on campus and give full play to the ecological effects of plants themselves.

Add green space places, such as reading desks on a large rice field base in this university: there is a shade tree and a circle of benches in the center of each reading desk, which mainly provides outdoor communication places for students to avoid disturbing quiet students indoors<sup>[9]</sup>. The original paddy field is reserved and reasonably applied to the campus by the method of landscape design, so that rice cultivation in the field is not only a display on the campus, but also gives its production function, which can satisfy the functions of learning, aesthetic education and culture on the campus, and let students experience farm work <sup>[9]</sup>.

#### **6.4. Improve The Quality Of Landscape Repair In Later Period**

In the campus, we can adopt the method of low maintenance landscape, because in campus activities, we mainly give priority to its cost. The main features of low maintenance landscape are low labor, low loss and low energy consumption<sup>[10]</sup>. Generally speaking, in the design of campus landscape, the labor cost of post-planting plant maintenance and pruning is relatively low, which reduces a lot of daily labor such as pruning and maintenance. Low energy consumption is the design and construction to avoid water consumption, electricity consumption and energy consumption; Low-loss refers to the facilities that are easy to wear and avoid frequent breakage and replacement. Often choose some plants with high durability, reduce artificial pressure and realize evergreen plants, taking into account the changes of the four seasons and seasons, especially the bare ones in winter, which lose the beauty of the campus.

### **7. CONCLUSIONS**

With the continuous development of society, the importance of campus landscape design is becoming more and more obvious. Only by doing a good job of plant configuration and landscaping on campus can campus culture and campus development be highlighted. In landscape design, the types of plant configuration mainly include trees, low shrubs, vines, flowers and plants, aquatic plants, etc.<sup>[11]</sup>, and the plants on campus are mostly trees, shrubs, tree groups, flowers and plants, etc. According to the growth habits of different plants, plant collocation should be reasonable and campus culture should be integrated into it. This paper mainly makes a simple discussion on the concept, methods and principles of plant configuration and landscaping. It also makes a theoretical summary on the theories of campus environment construction and plant landscape construction in colleges and universities in terms of plant living environment and the role of plants on the environment. Aiming at the existing problems in a campus, it puts forward corresponding measures. The early research and careful design on campus are important, but it also needs careful care and care in the later pruning and maintenance. Plant configuration is an indispensable part of campus landscape design in colleges and universities. From the perspective of ecological balance, meeting the living and spiritual requirements of teachers and students, and protecting the campus environment, the campus landscape design can play a maximum role and better benefit students and teachers.

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