

Research on the design of campus exterior space based on human perception-Take the new campus of Hebei Engineering University as an example

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Abstract

With the expanding scale of China's colleges and universities leading to the expansion of the number of people, the renewal of the concept of education and the gradual opening of colleges and universities, the requirements for the design of campus external space are also higher and gradually tend to be humanized. Sometimes we find that some external interaction spaces carefully designed by designers are often left unattended and unattended due to scale malfunction and lack of psychological experience due to difficulties in using them, such as the large open space behind some dormitory buildings and teaching buildings. In this context, I put forward some suggestions for the design of external interaction space of the campus by studying human perception in the planning and design of the new campus of Hebei Engineering University.

Keywords

College campus; Human perception; Space for interaction; New campus of Hebei Engineering University.

1. Introduction

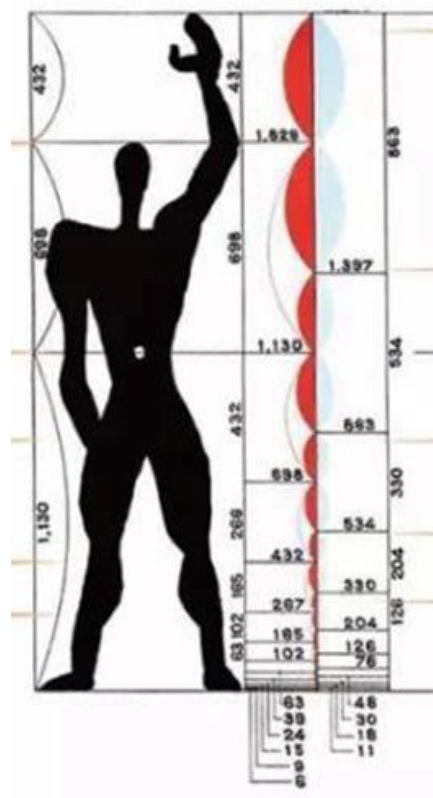
As a special space with a rich diversity of spatial forms, the campus is relatively closed in its spatial scope, but relatively active in its spatial vitality, containing most of the activities of teachers and students, such as learning, interacting, resting, reading, and so on. After a long period of accumulation and precipitation, the campus has already had its own unique cultural attributes, and with the expansion and new construction of major campuses in recent years, although the buildings, transportation and other kinds of facilities are sound, it is still difficult for people to perceive the intimacy and sense of belonging that the campus environment should have. Therefore, for the design of campus exterior space, we try to explore various points from the perspective of human perception, which helps to express the cultural, regional and humanistic nature of campus space, and then promote the development of campus space form in a good direction.

2. Connotations of human perception

Human perception includes both physical and spiritual aspects, with the physical primarily referring to the scale relationship in ergonomics, which in turn affects the comfort of the experience, and the spiritual focusing on the behavioral psychology component on a philosophical level, which in turn affects the level of emotional high.

As early as the 1st century B.C. the Roman architect Vitruvius had already made a more comprehensive discussion of the scale of the human body from an architectural point of view, and he found that the human body is basically centered on the navel from the relationship between the various

parts of the body. A standing man, the length of the hands laterally flat is exactly its height, toes and fingertips of both hands exactly in the belly button as the center of the circle. During the Renaissance, the artist Leonardo da Vinci drew the famous diagram of human scale based on Vitruvius' treatise. In the 19th century, the architect Le Corbusier and others made great contributions to the application of human scale in architecture, creating the modal system. Space is an objective form of material existence, with length, height, width, dimension, size, and reality. When people are active in the space, the spatial scale is bound to be modified and changed according to the human scale. The external space of the campus is different from other external spaces of public buildings in that it pays more attention to the perception of human experience. (Fig. 1)



3.1 Delineation of domain levels

There are also three levels of outdoor spaces on campus: individual spaces, small group spaces and public spaces. The personal domain space can be a small environment with a certain sense of support, such as a stone bench in the woods or a pile of rocks by a pond; the medium-sized domain space is a space that is heavily used in the campus and should have sufficient space to provide the possibility of interaction with small groups of different sizes; the public activity domain space should be a larger type of public space in the campus environment, and this space is often the representative of the campus space, such as the campus central plaza, central green space, etc.

3.2 Multi-sensory experience

Hearing is the second way of perceiving space, whether it is the happy chirping of birds, the sound of running water, the sound of reading aloud, the sound of the bell going to and coming from class, etc. All of these sounds are powerful in different environments to set the atmosphere. These sounds will increase people's sense of identity and belonging to the space; smell can also be very good to strengthen people's experience of space, is the auxiliary means to perceive space, the fragrance of the earth after the rain makes people feel cool and pleasant, the fragrance of flowers in spring makes people linger, these all provide a rich feeling of space; touch is the most direct feeling of space; people are also very sensitive to changes in temperature, people always avoid the hot sun in summer Exposure to the sun in summer, and human behavior in winter is always looking for a warmer environment, so the design of outdoor environment should pay attention to the spatial needs of sensory experience.

3.3 Appropriate sense of human scale

The change and expansion of college campuses become frequent nowadays, and the rising enrollment rate makes the campuses bigger, the plots bigger, the teaching buildings become more, and the external space places with the traditional mechanical functional partitioning, leading to the occurrence of scale and proportional disproportion, for example, there are campus squares that are easily two or three hundred meters. Such a spatial scale does not serve people well, and people walking in such a campus cannot feel the existence of the place, and there is no desire to stop and stay and have communication activities.

4. Study on the design of external space based on the new campus of Hebei Engineering University

4.1 Project overview

The new campus of Hebei Engineering University has a mixed layout of various functional areas, which are staggered and orderly, and become an organic whole. They can be interconnected and interpenetrated, basically conforming to the principles of building a learning campus, an ecological campus, a green campus, a harmonious campus and a harmonious campus. In the design of the new campus of Hebei University of Engineering, it strives to get rid of the inherent pattern of "axis + courtyard" in the planning and design of university campus, and follows the cultural line of the base with a low-density, scattered, irregular and organic growth development planning concept. The south gate is the main entrance, the east and west gates are the secondary entrances, and the north is bordered by a hill. The whole is nearly square, with delicate and textured group space, lively and energetic living street and artificial lake, shaping the free form in the intention. Get rid of the spatial pattern language of the traditional campus, maximize the landscape features of the base, create a campus form with landscape characteristics as the starting point for thinking, and create a poetic university living space with a student-oriented building layout according to the characteristics of campus living behavior. (Fig. 2)



Fig. 2 General plan of the new campus of Hebei Engineering University

4.2 Analysis of the current situation

The main problems with the current external space are as follows.

(1) The status quo of university campus planning and design in time and space fragmentation, the lack of a large number of external space places, basically grass greenery is the main, monotonous and uninteresting, not conducive to the formation of the overall habitat environment system characteristics of the campus external space design, the integration of its architecture and space relationship is not in line to go to carry the narrative, dialogue, lining, metaphor and other ideological functions, but also can not achieve the experience of campus space wholeness and It also fails to realize the experience of campus space as a whole and the expression of cultural meaning.

(2) The design of external space overemphasizes subjective will and function, ignoring human experience and feeling. The conversion at the transition space occurs in two aspects, one is the conversion of space function and the other is the conversion of human psychology, over-emphasizing the function and ignoring the human as the subject of space experience.

4.3 Design content

4.3.1 Design ideas

We create a sense of security, belonging and identity for students and faculty by giving the campus exterior space two qualities: ornamental and unique spirit of place, breakthrough from a reasonable spatial scale and scene creation, and finally combine these two points to divide and enclose the space to create a special spatial place.

4.3.2 Design options

(1) Increase the interaction of people, space and landscape by adding participatory external space vignette devices. Example: Regulate the peak of sin function to 2500 to ensure that people can enter, then put the sin function curve ring with the top surface of the circle to form the form of the device. Extract the skeletal lines of the form to form a thin circular tube of 10mm diameter to complete the entire shape of the device. Finally, white lacquered steel is attached to it to give it a futuristic and dreamy look. (Fig. 3)

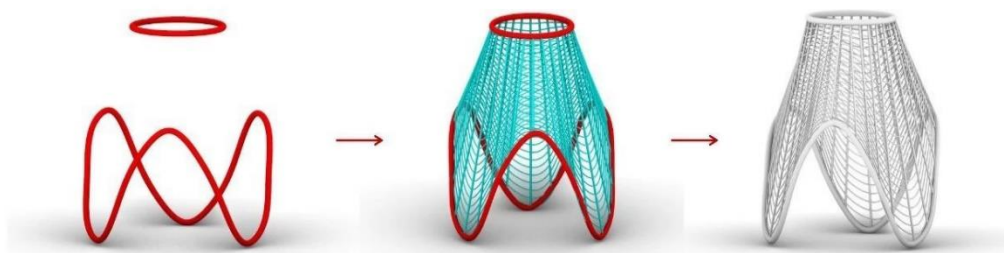


Fig. 3 Simulation case

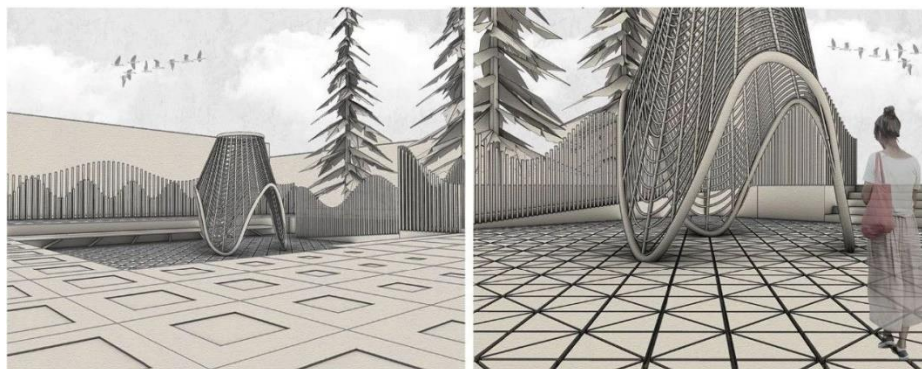


Fig. 4 Effect

(2) According to each person's different scale, preferences, behavior, to provide a variety of space scale, and thus can meet the needs of different people, different activities; first is a reasonable location: informal and formal seating area should be able to meet the different needs, for these people need to rest flow to provide a conspicuous or more hidden location. Comfortable scale: Generally, seating is purchased as a finished product, which is basically ergonomic. Variety of forms: The form of seating varies depending on the user, and can be roughly in the ratio of 1:8:1 for children, young people, and the elderly (Fig. 4), from benches with or without backs, to steps and parapets, and the edges of tree ponds. (Fig. 5)



Fig. 5 Seating and vignettes

(3) Provide relatively relaxing visual colors and materials. Vibrant color collision (orange, green, yellow, red, etc.) can bring people a sense of joy, soft light, comfortable temperature, friendly materials, tranquil colors can make people feel relaxed, on the contrary, hard materials, mixed colors, harsh light, visually unbalanced factors will bring people a sense of tension. Different materials and textures give people a variety of feelings, for example, outdoor raw wood flooring makes people feel close, smooth marble flooring makes people feel dignified, etc.

(4) Forming different scene-like spaces according to different locations. Through the introduction of the corresponding scenes, with the help of landscape architecture, sculptures and miniatures, plants and water bodies, decorative paving and other design elements, combined with the nearby building functions, for example, the external space near the architecture pavilion can build artistic scenes, mechanical classes build industrial style scenes, electronic logistics classes build futuristic scenes, etc. Building characteristic scenes makes it easier for service groups to experience the culture and

characteristics of the school, and its thematic performance meets the different landscape needs of teachers and students on the one hand, and increases their sense of identity and belonging to the school on the other hand, increasing the cultural and artistic nature of the school. (Fig. 6)



Fig. 6 Tianjin University exterior scene-based space

5. Summary

Summing up the above theoretical research, the design of campus external interaction space should consider not only the combination of space environment, leisure facilities and environment, but also the psychological feelings and emotional needs of the users, that is, students of the university, and guide the design of campus external interaction space according to the role of human body and psychology. As the cradle of talent cultivation, the interaction in the university is conducive to the students to broaden their thinking and produce new thinking, and become a new way of learning, and the existence of external interaction space undoubtedly has a positive effect on the cultivation of comprehensive talents in the university. Through interaction activities, students can naturally obtain more comprehensive knowledge information, channel their emotions and maintain their optimistic and cheerful character in an open space, which has a positive effect on the development of students' physical and mental health. Therefore, the existence of humanistic external interaction space on campus is undoubtedly of practical significance.

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