

# Humanistic Design of Practical Teaching Room Environment in Application-oriented Universities

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**Abstract.** With the expansion of domestic universities and the demand of the employment market for the diversification of talent training objectives, the practice-oriented universities and colleges have experienced the development from generation to maturity for nearly twenty years, forming their own unique teaching mode and teaching methods. However, the practical teaching buildings of most of these schools still follow the traditional use mode, and have not changed the design of the use space with the change of the talent training mode. Based on the teaching reform of the practice-oriented universities and colleges, combining with the design trends of modern educational teaching buildings, this paper focuses on the human-oriented needs of teachers and students, and discusses the new ideas of practical teaching room design suitable for the practice-oriented universities and colleges.

**Keywords:** Application Type; Integration of Teaching and Experiment; Humanization; Practical Teaching Building.

## 1. Introduction

Due to the influence of the original elite education mode and the long-term traditional use of the original teaching buildings, the existing experimental teaching rooms in colleges and universities basically maintain the original use mode and construction mode. There are still some problems in meeting the demand for teaching places according to the reform of the existing talent training mode in colleges and universities. To a certain extent, these problems will also restrict the deepening of education and teaching reform and affect the quality of the training for application ability.

The training of Application-oriented talents puts forward the requirements for colleges and universities not only to focus on Application-oriented practice in professional setting and other soft power, but also to ensure the development of professional practical teaching from the practical hardware level. Hardware conditions refer not only to the experimental building, teaching building and experimental equipment in the traditional sense, but also to the hardware of practical teaching space in terms of the training needs of new applied talents. Therefore, the training needs of applied talents are also changing imperceptibly with the change of social industry.

## 2. Contradiction and Demand of Teaching Experiment Space in Applied Universities

The teaching in Application-oriented colleges and universities focuses on cultivating students' practical ability, which is different from the previous elite education. What this need is that the theory can more directly serve the practical operation. Therefore, the proportion of practical education is greater than that of the previous ordinary higher education. Because we pay more attention to the cooperative relationship with enterprises, and considering the training of applied talents with practical operation skills to enterprises, the design of teaching room in applied universities is a very important problem.

College teaching includes theoretical teaching and practical teaching. In ordinary colleges and universities, theoretical teaching is often carried out in the architectural space of the teaching building, while experimental teaching is often carried out in single buildings such as the experimental building and the science and technology building. The space design of the laboratory varies according to the

needs of different majors in colleges and universities. The large-scale experimental equipment required by some majors requires the experimental space to have sufficient area and floor clear height, and needs to meet the laboratory architectural design specifications. Therefore, many experimental spaces are designed separately in the form of experimental teaching buildings in college buildings.[1]. However, this brings some disadvantages to students' practical operation. For example, students have less opportunities for practical operation, and their theoretical learning is difficult to be verified by practical operation quickly. For the people who use teaching and experimental space, their use experience is that most of the existing teaching and experimental buildings still urgently need reform and more reasonable and humanized design. They hope to increase more diversified space to meet the combination of theory and practice.[2].

### 3. Thoughts on the Design of Theoretical Teaching and Experimental Room in Applied Universities

As a new function of colleges and universities, we should not only think about how to cultivate students' practical innovation ability, but also build a space to adapt to the new teaching ideas. Therefore, the research on the design of teaching and experimental buildings in Application-oriented universities is of great significance. According to the education and teaching needs of Application-oriented Universities and the conclusions of our investigation, this paper briefly puts forward the following design considerations:

#### 3.1 Integrated Design of Theoretical and Practical Teaching Space

In Application-oriented colleges and universities, except for majors with special requirements, theoretical teaching mostly occurs in the teaching buildings. However, most of the teaching buildings in Colleges and universities still maintain the original space mode of ordinary classroom and ladder classroom. The teaching and learning behavior in this space is not much different from that in ordinary high schools. Therefore, in the traditional teaching building space, the Application-oriented teaching mode can not be matched with the appropriate architectural space, and the theoretical teaching and practical teaching will be difficult to be well integrated due to the limitation of teaching space. The integrated design of theoretical and practical teaching space means that the theoretical classroom and practical experimental operation are located in the same teaching space. This space can be flexibly divided according to the professional needs, so that the classroom can have a variety of teaching modes to meet the needs.

There should be a variety of design presentation methods for the integrated space of theory and practical teaching. According to some design cases and design theories at home and abroad, the following design methods can be summarized to deal with the integrated space mode of theory and practice teaching required by Application-oriented universities in the design:

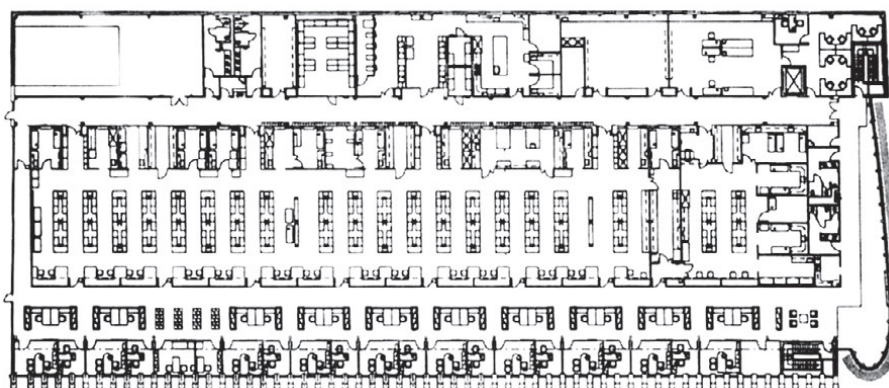
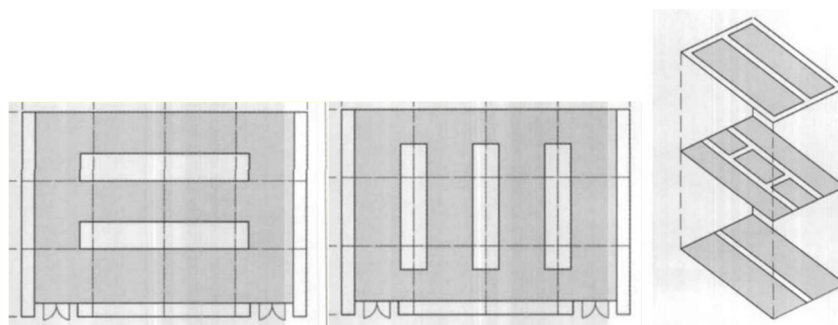


Figure 1. Plan of Georgia public health laboratory

(1) Large space experimental teaching mode. This model is more common in the experimental buildings of foreign universities in recent years. In order to create a good team cooperation atmosphere and facilitate interdisciplinary cooperation, the large space laboratory integrating experiment and research can ensure a good operating environment in every corner of the laboratory through the treatment of artificial ventilation and lighting system. This kind of layout is adopted in the public health laboratory of the University of Georgia in the United States. The main experimental space is arranged in the core area of the large space, and the research area of independent small space and flexible learning and rest space are arranged around (as shown in Figure 1) [3].

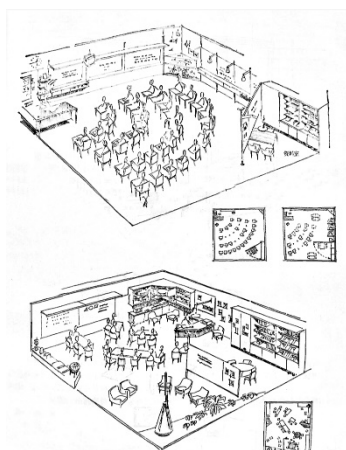
The advantages of large experimental space are in flexible spatial segmentation and strong spatial coherence, which can meet the flexible switching between teachers and students' practical operation, research and learning. The disadvantage of this model space is that the artificial lighting and fresh air system required by large space need large energy consumption, which is not friendly to the concept of green building advocated by our country.

(2) Modular practical teaching space system. When designing the plane of experimental buildings, modular design method is often used to meet the requirements of laboratory applicability and variable function. Laboratory module is the basis of laboratory architectural design. At the beginning of architectural design, the laboratory unit module with strong adaptability is designed, and then it is changed according to different experimental types, and designed in the form of two-way module and three-dimensional module [4]. The setting of corridors with different locations and different numbers can meet the needs of different professional laboratories for indoor lighting and ventilation, and flexibly define the space. It can be designed and applied in the space of integration of teaching practice.



**Figure 2.** Design of two-way and three-dimensional modules in the laboratory

(3) Flexible design of small teaching space. In the small teaching space, some majors with strong practicality usually need independent and flexible teaching space for professional course learning, which is different from the layout of ordinary theory-teaching classroom. Then the flexible layout design of small teaching space is very necessary.



**Figure 3.** Flexible layout of audio-visual room

For example, group areas are divided according to professional teaching tasks, and humanized tables, chairs and rest space are set according to professional requirements. Small writing boards or projections can be hung on the side wall of the classroom, which is more convenient for teachers to explain in groups. If there are no special design requirements for students' practical operation space, it can be integrated with the theoretical teaching space. For the practice area that needs to be slightly distinguished, or has design requirements such as electrostatic floor, a relatively independent operation area can be divided in the teaching space of theory course. In the experimental teaching space such as audio-visual room, the shape and size of the space are flexible. In order to meet the needs of new teaching equipment, the shape and size of the classroom can change greatly. Curved square, polygonal and fan-shaped planes are sometimes more suitable than rectangular ones. Because of the use of diversified listening tools and lively teaching methods, there is a need for flexible use of the room. Sometimes we should not only consider the movement and combination of furniture and equipment, but also study the possibility of setting movable partitions. [5]

Of course, the practice teaching area in the school is not limited to the interior of the room. The gray space of many buildings, such as the space below connecting beam, the entrance space sequence of the building, the rest terrace on the floor, etc., can be used as the teaching practice space or the display space of practice works. Practical teaching in colleges and universities is often limited by the size of the room or affected by the singleness and dryness of practical teaching, so the setting of gray space in the experimental building room can make up for this shortcoming. In architectural design, we emphasize the importance of gray space for enriching architectural space. Similarly, for building users, the existence of gray space gives more possibilities for building use. Practical teaching can also benefit from the setting of grey space, which not only enriches the diversity of the use of teaching architectural space, but also enables practical teaching to give students sufficient curiosity and interest in combination with daily teaching, and can fully publicize the results of school practical teaching. Therefore, the setting of grey space combined with practical teaching in experimental room design is important in architectural modeling and architectural use function.

### **3.2 Safety and Rationality Design of Practical Teaching Space**

In the practical teaching space, or in the past experimental buildings and laboratories, many science and engineering students often spend a whole day or even longer in it in order to wait for an experimental result, which leads to many problems. The experimental teaching space integrates the needs of life, but it can not meet the requirements of users' pleasant use for a long time. Therefore, the fatigue and upset psychology brought by it is also not humanized, which indirectly leads to the problem of experimental safety.

The safety design of practical teaching space first needs to ensure the standardization of experimental space design with special needs, such as the relevant requirements of fire and explosion-proof design, which is the most basic requirement. Then we discuss how to ensure the safety and rationality of students' use from humanistic design on the premise of meeting basic needs. Therefore, it is a tentative idea to set up relatively independent rest space and safe disaster avoidance space in the experimental space. Many colleges and universities have teaching office space such as "Professor studio", so it is very necessary to well organize workstations, studios, experimental rooms and rest space in combination with professional characteristics. Therefore, we should not only ensure the safety of experimental practice, but also pay attention to its rationality from the needs of teachers and students [6].

### **3.3 Utilization of Multi Definition Campus Space**

Multiple definitions of the use of campus space for the Application-oriented thinking of teaching and practice space, if extended to the scope of the whole campus planning, the places available for education in the campus of colleges and universities, such as teaching buildings, libraries, school enterprise cooperation and exchange centers, school run factories, and even campus landscape places, are very meaningful places for Application-oriented Education.

Apply practical teaching to all possible places to provide teachers and students with a broader environment for practical education and learning. For example, students of Architecture College can use outdoor places to organize construction practice teaching, and mechanical majors can use campus places to carry out relevant manufacturing display teaching. The opening-up activities of colleges and universities recognized by the public are very beneficial activities to attract students, communicate and publicize themselves. Expanding the practical teaching in Colleges and universities to the whole social category, making full use of the architectural space and landscape facilities of the campus and multiple utilization are worth thinking about the output and introduction of applied talents for teaching and practice.

#### **4. Humanistic Thinking on Experimental Teaching Room in Application-oriented Colleges and Universities**

In recent years, it has been frequently reported that there are dangerous accidents in the experimental rooms of colleges and universities, and even cause personal casualties. Is there a lack of basic safety guarantee and human care in the design of experimental rooms in colleges and universities, that is, the lack of thinking of humanistic design? Especially in Application-oriented universities, we need to focus on cultivating students' application technology. The experimental room is an important place to ensure students' practice, so the humanistic design of experimental teaching space is very meaningful. In many experimental buildings and laboratories, there are sophisticated, highly operational and dangerous experiments and practices. Some practical experiments are time-consuming and tiring. In the design, it is humanized to fully consider the use needs of the experimenters and pay more attention to their use feelings, rest and relaxation needs, it is the design reform of teaching experiment space.

Compared with traditional university laboratory buildings, modern university laboratory buildings pay more attention to humanized design, adding rest space, leisure service space, exhibition space of experimental teaching achievements and experimental scientific research achievements, business negotiation space and so on. Communication space is a link element in cluster architecture, which can effectively promote the communication and exchange between different disciplines and within the same discipline. In practice, we often set the entrance gray space and courtyard space as the link among the experimental buildings to promote the integration between each other; The atrium space in the building is combined with the development trend of modern university laboratories, and is comprehensively designed with the functions of experimental results display to form a distinctive building environment; Corridor nodes and balconies are set as characteristic communication platforms to provide humanized space. Taking the teaching needs of architecture as an example, such a major that pays more attention to practical scheme, computer drawing operation and manual model making, the theoretical application and practical operation in the classroom are closely related, the practice space and place required are also very frequent, and are closely related to the daily life of students. Therefore, when students do this design, they contact their own needs and endow the classroom space with many functional and humanistic designs, including handmade space, special desks that can be used for practical operation, design space for rest and leisure, and conference space for collective discussion. The richness of space gives a more flexible combination of teaching and practice.

#### **5. Conclusion**

Starting from the educational reform background of Application-oriented Colleges and universities, this paper investigates and puts forward that the design problems of teaching and experimental teaching buildings need to be solved urgently in such colleges and universities, and tentatively analyzes and puts forward solutions, expecting to arouse the attention of the design for experimental

teaching buildings in Application-oriented Colleges and universities, Give hardware support to the applied talent training mode from the spatial level of the environment!

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