

# Research on the construction and management path of university laboratories in the context of integration of industry and education

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**Abstract:** Based on the background of quality education, colleges and universities should constantly improve the curriculum system and optimize the teaching links, especially when carrying out experimental teaching, the basic guarantee should be provided by introducing experimental equipment and constructing experimental places. In order to give full play to the effectiveness of experimental teaching, teachers should carry out the construction and management of laboratories based on the integration of production and teaching. Based on this, college teachers should introduce advanced technology and equipment to assist laboratory construction and management, thereby improving the quality of experimental teaching and laying the foundation for the school to promote curriculum reform. In view of this, this paper takes the author's teaching experience as the starting point, briefly expounds the concept of integration of industry and education, analyzes the current situation of university laboratory construction and management, and puts forward a practical practical path based on the background of integration of industry and education, aiming to provide reference for university leaders and teachers to promote scientific research, and ultimately to transport composite talents for social development and national construction.

**Keywords:** integration of production and education; Colleges and universities; laboratory; Construction and management; Practice path

## introduction

With the advent of a new era, a variety of advanced teaching technologies have emerged. Among them, the integration of industry and education means that colleges and universities need to take effective measures to organically integrate actual teaching with enterprise production, thus enabling industry and teaching to interact and promote each other, and ultimately building a new teaching model that integrates talent cultivation, technical research and industrial services. Under the background of vigorous social and economic development in China, science and technology are developing rapidly, and local industries are upgrading constantly. The integration of local industries and college education has gradually deepened from the initial "combination of industry and education" to the "integration of industry and education" mode. Nowadays, it has gradually become an inevitable trend for colleges and universities to promote the teaching reform of integration of production and education. Therefore, it is necessary to build and manage laboratories based on this perspective, which can provide basic guarantee for the smooth progress of experimental teaching and scientific research, and ultimately can promote regional economic development while promoting educational reform. How to promote the construction and management of university laboratories based on the integration of production and education is an important issue that leaders and teachers urgently need to solve. This paper will focus on this issue to explore in depth, with a view to benefiting university administrators.

## 1. Elaboration on the concept of industry education integration education

Under the background of the new era, colleges and universities should include promoting the integration of industry and education into the scope of important teaching tasks. By promoting the integration of industry and education, colleges and universities should introduce advanced concepts and technologies into teaching in a targeted manner in combination with the needs of industrial development, so as to match the demand for talents with the supply of talents. Based on this, colleges and universities should deeply elaborate the connotation and significance of this advanced education concept before carrying out the integration of production and education.

First, implement the education policy of building morality and cultivating people. Teachers should include building morality and cultivating people in the basic teaching tasks, so as to implement ideological and political education, social practice and cultural education. In this process, they should actively infiltrate the socialist core values, and carry out comprehensive education of morality, intelligence, physical integrity, beauty and labor. Among them, the basic teaching tasks can be completed through the integration of industry and education, so as to constantly improve the education and teaching system, Finally, collaborative education can be realized. Secondly, actively infiltrate the concept of collaborative education, and colleges and enterprises seek appropriate opportunities to build and implement the mode of collaborative education between schools and enterprises, so as to improve the talent cultivation program and ultimately effectively improve the quality of talent cultivation. In order to deeply implement the concept of integration of industry and education, colleges and universities need to clarify the connotation of the concept of collaborative education to teachers and students and enterprise managers, so as to build a new teaching mode through the apprenticeship system, promote the upgrading of professional structure and regional economic development. In the process of promoting the integration of industry and education, colleges and universities can provide students with new technologies and new ideas, and ultimately deepen the integration of theoretical and practical teaching. Third, we should clearly implement the concept of

cooperative development education. Under the background of the new era, colleges and universities should explore an effective development mode of win-win cooperation, and promote the integration of industry and education in the process of school enterprise cooperation. Now, college teachers and enterprise personnel should fully realize the important role of cooperation in the future development of both sides, so that enterprises can see the benefits and development of the integration of industry and education, It can stimulate enterprises to participate in school enterprise cooperation, and finally achieve the effect of school enterprise integration.

## **2. Analysis of the present situation of laboratory construction and management in colleges and universities**

### **2.1 Waste of construction resources**

Colleges and universities should build laboratories for different majors, different disciplines and different types of experiments. However, according to the author's practical research, with the continuous enrichment of professional types and curriculum content, the laboratories built by colleges and universities have been difficult to meet the needs of students' experimental learning, and need to be expanded and transformed, which ultimately leads to excessive financial expenditure of the school. In addition, the laboratory constructed by colleges and universities has the problem of simplification, which will eventually lead to the duplication of laboratory instruments and equipment, virtually increasing the construction cost of the laboratory and causing waste of resources.

### **2.2 Low laboratory utilization**

When formulating a laboratory construction plan, colleges and universities generally choose high-quality and the most advanced construction technology to achieve the expected construction results. However, according to the author's practical research results, the laboratory managers in many universities are not equipped with perfect software, and the curriculum teachers do not master advanced operating technology. As a result, even if various laboratories are established, the teaching role of advanced laboratories can not be fully played because of teachers' insufficient teaching ability and lack of management mechanism. The specific performance is that laboratory equipment is idle or not fully utilized, Even the damage and maintenance are not timely. In addition, some colleges and universities with insufficient comprehensive strength will choose more basic teaching equipment when carrying out laboratory construction work, and have not purchased large-scale laboratory equipment, thus unable to demonstrate the entire experimental process for students, which ultimately leads to the decline in the quality of curriculum teaching.

### **2.3 Less opportunities for interdisciplinary learning**

The experimental projects set up by colleges and universities involve the basic theoretical knowledge of various disciplines, but colleges and universities have less training for experimental technicians. Therefore, when organizing students to carry out experimental teaching, experimental teachers will be unable to help students deal with various interdisciplinary applications because of their poor comprehensive ability, and eventually the experiment will fail because they cannot give students correct guidance, resulting in poor teaching results. In addition, university laboratories are relatively independent. When carrying out experimental teaching, teachers from different disciplines failed to communicate and interact in a timely manner, thus failing to enrich their knowledge reserves. It also makes the scope of students' knowledge radiation smaller, which is not conducive to the smooth development of experimental teaching.

### **2.4 Inadequate communication between production and education**

In order to send more practical and comprehensive talents to enterprises, colleges and universities should focus on practical teaching, in which experimental teaching plays an important role in the whole practical teaching. Based on this, colleges and universities need to do a good job in laboratory construction and management, but in the process of construction, colleges and universities need to maintain communication and contact with enterprises, so as to achieve the talent training goal of delivering high-quality talents to enterprises. However, in practice, most colleges and universities only signed cooperation agreements with enterprises, did not conduct in-depth exchanges, and did not understand the development trend and required talents of enterprises. However, colleges and universities only rely on the past teaching experience to carry out teaching activities, which ultimately leads to a low degree of fit between the talents cultivated by schools and the personnel required by enterprises. In order to ensure their smooth employment and adapt to the job, enterprises need to organize knowledge training, which virtually increases the cost of enterprises.

### **2.5 Inadequate openness of the laboratory**

Most college students only use laboratory equipment and equipment when learning specific courses. In the rest of the time, the laboratories are mostly closed at Chint, resulting in students being unable to carry out large-scale experiments, which ultimately affects the effectiveness of experimental teaching and is not conducive to the cultivation of students' comprehensive quality. Due to the poor comprehensive strength of colleges and universities and the small scale of laboratory construction, some experimental courses can only be cancelled. Simply organizing students to carry out some simple experiments will reduce students' enthusiasm and motivation for learning

over time, and ultimately lead to poor teaching quality.

### **3. Practice Path of Construction and Management of University Laboratory under the Background of Integration of Production and Education**

#### **3.1 Establish disciplinary company system**

It is an important task for colleges and universities to build laboratories based on the integration of industry and education. Among them, we can promote the development of school enterprise cooperation by building a disciplinary corporate model, which can meet the needs of enterprise development, improve the practical teaching system, and provide a material basis for cultivating application-oriented and practical talents. For example, college teachers should introduce both hardware and software resources when establishing laboratories. When carrying out the construction of hardware facilities, colleges and universities should fully consider the current economic situation and development trend of the school, and then be able to choose scientific and advanced laboratories for students. When developing software facilities, colleges and universities should try to adopt the management mode of cooperative enterprises, introduce appropriate enterprise resources in combination with the characteristics of their own specialties, and invite enterprise technicians to carry out laboratory teaching guidance, so that students can understand the enterprise culture on the basis of understanding the work process and work mode in advance. When carrying out laboratory construction, colleges and universities should combine the development strategy and future trend of the school, so as to integrate the laboratory construction with the local main industries. In this way, not only can we give play to the characteristics of professional teaching, but also can promote the follow-up development of students. To sum up, integrating the disciplinary company model into the laboratory construction can not only improve the level of laboratory construction, but also improve the quality of talent cultivation.

#### **3.2 Dividing modular functional areas**

Colleges and universities should also try to build modular functions when building laboratories, and make each functional module as an independent part. In this way, teachers can combine different functional areas with curriculum content and experimental categories when conducting experimental teaching, which can not only reduce the investment cost of experimental equipment, but also improve the utilization rate of laboratory space. For example, colleges and universities do not set up comprehensive laboratories according to professional courses when building laboratories. Instead, they set up large laboratories of different specialties on a floor by floor basis. For laboratories assigned to floors, they only set up a separate operating platform for test courses with high risk factors. Other tests are completed on a public test platform. Colleges and universities divide the interior of the floor into multiple functional areas, including data query area, material weighing area, article heating area, etc., and number the experimental areas in detail. In this way, teachers can combine the numbers freely according to the specific experimental operation steps to meet the needs of experimental teaching. With the expansion of the number of college students and the expansion of the school scale, it is necessary to introduce new experimental equipment according to the teaching needs, and colleges and universities need to update the functional areas of experimental courses in half of the categories, so that the new functional areas can replace the functional areas that are separated from development, and ultimately ensure that the laboratory can continue to use. To build a laboratory based on the integration of production and education, it is necessary to divide the traditional laboratory into modules, which can not only reduce the cost of school equipment, but also appropriately increase the available space of the laboratory.

#### **3.3 Interdisciplinary integration of high-quality resources**

Some experimental projects carried out by colleges and universities cannot be completed by relying on a certain professional knowledge. In this process, other professional curriculum knowledge is needed to assist in the completion. When building a laboratory based on the integration of production and education, colleges and universities should focus on more comprehensive practical projects to build a comprehensive laboratory for students, which can effectively improve students' comprehensive practical literacy. For example, colleges and universities can complete interdisciplinary resource integration for comprehensive experiments, which can generally be completed from two aspects: laboratory division and experimental teacher training. Laboratory classification refers to that when building laboratories, independent comprehensive laboratories can be set up on the first floor of the building, and on this basis, functional blocks can be divided, and each functional block is numbered. When students encounter more comprehensive experimental projects, Then we can combine the subject knowledge to carry out the numbering combination, and finally we can successfully complete the comprehensive experimental projects. For the training of experimental teachers, university leaders should regularly organize teachers of different majors to conduct academic discussions, and propose the best experimental scheme for more comprehensive experimental projects, so that teachers can provide professional guidance and help when students carry out experiments. Colleges and universities should pay attention to the integration of interdisciplinary resources when setting up laboratories, which can not only improve the professional shipping of experimental teachers, but also enrich the knowledge system of students, and ultimately enable them to become compound talents needed for social development.

#### **3.4 Establish an open laboratory**

In the process of laboratory construction, colleges and universities should specially build open laboratories for students, so that students

can combine experimental projects to develop compliant experimental programs, and complete experiments through independent inquiry and cooperative inquiry. In order to improve the students' attention to the open laboratory, colleges and universities can formulate corresponding reward mechanisms to encourage students to actively participate in the independent exploration of experiments, and finally realize the teaching goal of cultivating talents with comprehensive quality. For example, when colleges and universities build laboratories, they can set the second floor as an open laboratory and open it to all teachers and students. In order to ensure the reasonable use of open laboratories, corresponding rules and procedures should be formulated. Students can obtain the permission to use the laboratories after the review when they need to submit laboratory use applications and experimental plans. When organizing students to carry out experimental exploration, teachers should do a good job of supervision to avoid students' safety accidents caused by illegal operations. In addition, colleges and universities should also set up a reward mechanism in line with their own learning conditions in combination with the open laboratory established by the university. Teachers should require students to organize the experiment process into an experiment report after completing the open experiment and submit it to professional teachers. After that, teachers should make a comprehensive evaluation and include their scores in the final evaluation. For projects with complicated experimental steps or in the course of the experiment, teachers should assist students to carry out experimental exploration and invite expert groups to conduct random inspection tonight, Finally, it can ensure the successful completion of the experimental project. To sum up, by establishing open laboratories, colleges and universities can grant a certain right to use the laboratories, and then their comprehensive abilities can be steadily improved.

### 3.5 Building a networked experimental platform

In Gujian Laboratory, universities should determine the scale of the laboratory based on the comprehensive strength of the university. In order to cover all experimental courses, teachers should introduce advanced technology and equipment based on the perspective of maternity leave integration to build an online experimental platform to help students complete the experimental courses online. For example, due to limited funds, some universities have small laboratories. In order to meet students' learning needs, they can introduce VR technology and build VR laboratories for students relying on multimedia technology. In this process, students need to wear VR glasses to carry out experimental operations, and students' operating procedures will be directly fed back to the computer homepage, so that teachers can provide targeted technical knowledge based on students' operating conditions, and ultimately break the restrictions of equipment and places, which can effectively save experimental costs and ensure the smooth completion of course tasks. To sum up, by building a network experimental platform, we can make up for the shortage of laboratories in colleges and universities, and at the same time, we can improve the teaching quality of experimental courses in colleges and universities.

## 4. Conclusion

To sum up, in order to adapt to the development trend of modern education and teaching, colleges and universities should pay more attention to the construction and management of laboratories. Among them, we can improve the experimental teaching level of colleges and universities by establishing a disciplinary company system, dividing modular functional areas, integrating high-quality resources across disciplines, establishing an open laboratory, and building a networked experimental platform, so as to provide high-quality, highly skilled comprehensive talents for social development.

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