

Research on the Cultural Construction of Private University Laboratories Based on Cultural Education

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Abstract: University laboratories serve as crucial hubs for scientific and technological innovation and play a vital role in nurturing talents. As pivotal spaces for both teaching and scientific research, the development of laboratories necessitates not only investment in scientific research equipment and experimental facilities but also in cultural construction. This cultural aspect holds significant importance in promoting the comprehensive development of students and enhancing scientific research capabilities. This article concentrates on the strategies for cultivating laboratory culture in private universities, addressing six key dimensions: spiritual culture, institutional culture, scientific culture, innovation culture, safety culture, and shared culture.

Keywords: Laboratory; Cultural education; Cultural construction; Private universities

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1. Introduction

University laboratories serve as pivotal hubs for scientific and technological innovation and play a crucial role in nurturing talents^[1]. While substantial investments are made in laboratory hardware during construction, private university laboratories must also prioritize the development of the soft power inherent in laboratory culture. This article integrates spiritual culture, institutional culture, scientific culture, innovation culture, safety culture, and sharing culture.

The construction of laboratory culture holds immense significance, contributing to the reform and implementation of experimental teaching, the consolidation of subject concepts, the enhancement of the school's reputation and attractiveness, and the establishment of the school brand. In addition, fostering an excellent teaching and study style in the talent training process is essential for improving teaching quality. It plays an important role in cultivating students' rigorous scientific attitudes, and professional practical abilities, and stimulating exploratory and innovative thinking^[2].

2. Theoretical basis for the construction of university laboratory culture

Laboratory culture constitutes a vital component of campus culture construction, representing a cultural form intricately linked to the laboratory itself. It plays a key role in the survival and development of the laboratory, serving as an enduring intangible asset within laboratory construction [3].

The construction of laboratory culture encompasses material culture, institutional culture, and spiritual culture. Material culture emphasizes the ambiance and professional characteristics of the laboratory, encompassing elements such as experimental buildings, equipment, and decor. Spiritual culture, an implicit facet of this culture, embodies the school's spirit, teaching style, study approach, class demeanor, and interpersonal relationships. This is manifested through professional development, historical evolution, participation in science and technology competitions, and engagement in teaching and research activities. Institutional culture, functioning as an internal guarantee mechanism, dictates the development and continuity of laboratory culture. It includes components such as the "Laboratory Safety and Health System," "Experimental Instructor Work Responsibilities," "Student Experiment Code," "Experimental Teacher Job Responsibilities," and "Experimental Teacher Class System." The schematic representation of laboratory culture construction is illustrated in **Figure 1**.

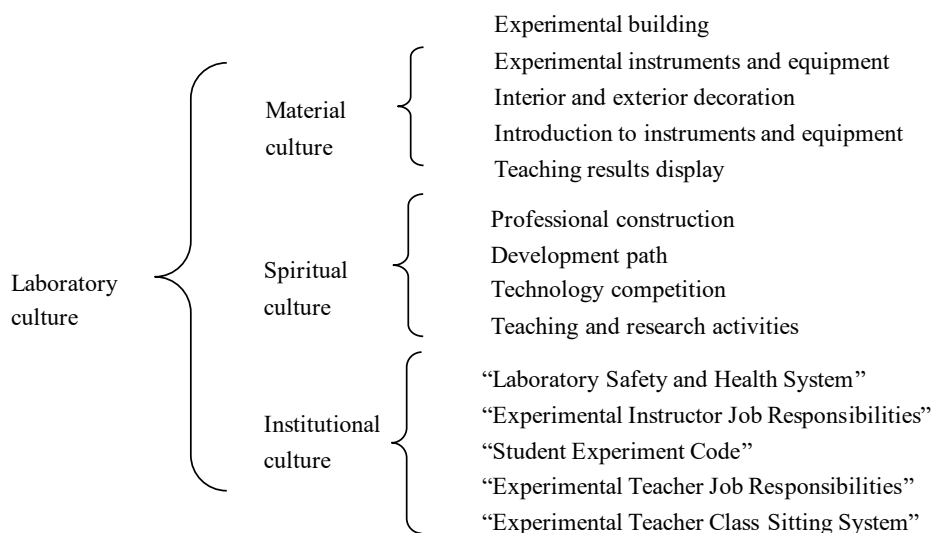


Figure 1. Construction content of laboratory culture

3. The educational function demonstrated by the cultural construction of university laboratories

In December 2016, General Secretary Xi Jinping emphasized at the National Conference on Ideological and Political Work in Colleges and Universities the need to prioritize cultural education in shaping individuals. For higher vocational colleges, the integration of cultural inheritance and innovation with ideological and political work is essential to cultivate virtue and nurture individuals on a new path. The core of laboratory culture education lies in utilizing culture as a medium to positively guide values, life perspectives, and worldviews, thereby advancing laboratory construction. The educational function of laboratory culture construction is mainly reflected in the following three aspects.

3.1. Create an excellent cultural atmosphere

Material culture, as a fundamental aspect of laboratory construction, showcases the laboratory's temperament

and professional characteristics, emphasizing its scale. Since students spend a significant portion of their school time in laboratories engaging in practical training and participating in science and technology competitions, the construction of laboratory culture becomes crucial. By fostering an excellent cultural atmosphere, students can excel in experiments and benefit from the positive influence of the school's cultural environment. This not only improves physical and mental health, encourages innovative thinking, and fosters a love for science but also enhances a sense of belonging, helping students understand the world and themselves. The constant process of self-improvement and enrichment establishes a correct outlook on life, values, and worldviews, equipping students to confidently face life's challenges with rationality and clarity, thereby enhancing their overall abilities.

3.2. Guide correct values

Laboratory culture represents the spiritual consensus between teachers and students, encapsulating a code of conduct that must be followed ^[4]. The manifestation of laboratory system culture in rules and regulations is crucial for guiding the behavior of teachers and students. Disseminating these rules and regulations to students, coupled with reinforced value guidance, ensures orderly conduct. By enhancing institutional cultural awareness, students adhere to behavioral norms, contributing to their self-education and growth. This fosters the unique cultural characteristics of the laboratory, laying the foundation for cultivating students' comprehensive development and creating an excellent school and study style.

3.3. Promote the comprehensive development of students

University laboratories serve as spaces for innovation and the enhancement of comprehensive abilities. A positive, healthy, and progressive laboratory culture significantly impacts the enthusiasm of both teachers and students within the school, deepening communication, cooperation, trust, and unity. Moreover, laboratory culture embodies the shared beliefs and aspirations of teachers and students, establishing a sense of closeness, trust, and belonging. This silent, pervasive education achieves the goal of nurturing individuals in a harmonious educational environment.

4. Problems existing in the construction of university laboratory culture

The construction of university laboratory culture has emerged as a means for institutions to impart cultural education, yet several challenges persist.

4.1. Problems in the construction of material culture

Firstly, issues arise during the construction of material culture. Some university laboratories face challenges such as poorly planned construction funds and low fund utilization rates, leading to diminished construction efficiency. Secondly, independent work within different majors results in a lack of information sharing, causing the repetition of laboratory equipment purchases and subsequently reducing overall laboratory utilization rates. Thirdly, the layout of laboratories is often impractical, posing safety risks due to inappropriate arrangement of instruments and equipment. Especially concerning are the cases where old teaching buildings are converted into experimental structures, with internal water and electricity arrangements failing to meet fire protection standards. This compromises the safety of storing hazardous materials, chemicals, and flammable or explosive substances. Lastly, a failure to facilitate resource sharing among laboratories exacerbates inefficiencies.

4.2. Problems in the construction of institutional culture

The laboratory system's pivotal role in ensuring normal operation and maintaining laboratory order necessitates

a standardized approach. However, despite colleges and universities formulating their own laboratory rules and regulations, many institutions neglect the crucial aspect of system improvement and updates. Reliance on outdated regulations that no longer align with the latest national standards and requirements impedes the progress of laboratory culture construction. Inadequate publicity efforts lead to low awareness among teachers and students, resulting in a weak willingness to learn independently. Consequently, the laboratory system remains more of a formality than an effectively applied framework in actual use.

4.3. Problems in the construction of spiritual culture

Some colleges and universities, particularly those with a short operating history, are still in the early stages of laboratory culture construction. These institutions often lack cultural accumulation in their laboratories and neglect cultural excavation and exploration. In some instances, they might replicate laboratory culture construction from more established universities, which may not align with the goals, developing positioning, and subject characteristics of private universities. This mismatch hinders the integration of laboratory construction development due to a lack of understanding of the functions and connotations of laboratory culture construction ^[5].

5. An effective approach to building and educating private university laboratories

Given the challenges in the construction of laboratory culture, a comprehensive strategy is proposed to develop spiritual culture, institutional culture, scientific culture, innovation culture, safety culture, and shared culture. Spiritual culture serves as the core, institutional culture as the criterion and scientific culture as the connotation. Simultaneously, innovation culture acts as the driving force, safety culture as the guarantee, and shared culture as the direction, embodying a six-in-one strategy that amalgamates cultural elements, as illustrated in **Figure 2**.



Figure 2. Cultural construction of a six-in-one laboratory

5.1. Emphasizing spiritual culture as the core

The guiding ideology for laboratory construction is rooted in the core concept of spiritual culture, shaping a laboratory that reflects the characteristics of the times and the discipline. Laboratory managers, teachers, and students, as the creators of laboratory culture, must take a leading role. By fostering a harmonious laboratory

atmosphere and achieving emotional, cultural, and mission identification, the overall quality of the laboratory can be elevated. Mobilizing and fully engaging the enthusiasm and initiative of laboratory stakeholders is crucial, guiding positive cultural values, and establishing the correct perspective on life, values, and worldviews, thereby promoting laboratory development and mutual growth.

5.2. Upholding institutional culture as the criterion

Institutional culture, a reflection of a school's historical foundation and humanistic characteristics ^[6], serves as the standard and execution guarantee for constructing university laboratory culture. This culture facilitates the guiding and restraining role of laboratory culture, promoting self-education and growth of teachers and students. Beyond being a collection of rules and regulations, institutional culture should be deeply ingrained, shaping good behavioral habits, standardized conduct, and a positive laboratory image. Private university laboratories should align institutional culture with school goals, development orientation, and subject characteristics. Regular updates to rules and regulations following national standards are essential, along with improvements to various systems, such as scientific and technological information management and internal mechanism reform.

5.3. Elevating scientific culture as the connotation

Scientific culture is the core of laboratory culture construction, requiring adherence to scientific and standardized principles in laboratory construction and operation. Teachers and students must follow relevant laboratory regulations and standardized experimental procedures. Utilizing modern information management technology is essential to enhance the informatization level of laboratory management, ensuring rational resource allocation and utilization efficiency. Big data technology can integrate laboratory process management, promoting the informatization of the experimental course library, instruments, equipment, consumables, and safety management.

5.4. Fostering innovation culture as the driving force

Innovation culture is the soul of laboratory innovation, guiding activities, behaviors, and systems within the laboratory. To inject vitality into laboratory culture, it is crucial to innovate management concepts, highlight key disciplines, and optimize layouts comprehensively. Laboratory management should adapt proactively to development, integrating innovative culture into management, reshaping innovation activities, and fostering a scientific research performance assessment system that encourages daring innovative endeavors ^[7].

5.5. Ensuring safety culture as a guarantee

Safety culture is integral to laboratory culture, emphasizing the importance of safety management in constructing laboratory safety culture. Establishing safety education, safety management systems, emergency plans, safety learning and examination systems, and basic courses on laboratory safety are essential steps. Disseminating safety knowledge through technology and conducting safety lectures ensures that laboratory safety remains a permanent focus, building a robust long-term safety system ^[8].

5.6. Embracing shared culture as a direction

In the era of rapid development, laboratory culture must evolve. Shared culture, a key aspect of the expansion of laboratory culture in private universities, underpins the sustainability and diversity of laboratories. Utilizing resources both inside and outside the laboratory through the sharing of equipment, materials, and human resources enhances experimental efficiency and quality. Shared culture broadens the connotation of laboratory culture, enriching its diversity. Knowledge, culture, and experience sharing across different fields promote the intersection and integration of diverse disciplines, fostering the diversified development of laboratory culture ^[9].

6. Conclusion

The construction of laboratories holds immense significance for the teaching and educational endeavors of private colleges and universities, directly influencing the level of laboratory development and the quality of talent training. By precisely understanding the essence of laboratory culture and embracing the core construction principles of spiritual culture, institutional culture, scientific culture, innovation culture, safety culture, and shared culture, the impact of laboratory culture on talent training, scientific research, innovation, entrepreneurship, technology transformation, and sustainability can be effectively amplified. This approach plays a pivotal role in guiding students to cultivate a correct outlook on life and values, fostering rigorous scientific attitudes, enhancing professional practical abilities, and sparking their capacity for exploration and innovative thinking.

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Disclosure statement

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