

# *Ideological and Political Education in College Experimental Teaching*

Xiaohuan Wang, Li Sun, Kai Lv

*School of Materials Science and Engineering, Inner Mongolia University of Technology, Hohhot,  
010051, China*

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**Abstract:** Experimental teaching in colleges and universities plays an important role in the whole training process of students. However, the integration of ideological and political elements in experimental teaching in many colleges and universities is very scarce. This paper combs the common ideological and political elements in experimental teaching, including safety awareness and responsibility awareness; Innovative thinking and scientific research accomplishment; Professional quality, craftsmanship spirit; Sense of overall situation and team spirit. Through innovative experimental teaching design and experimental teaching methods, experimental teachers properly, flexibly and silently integrate ideological and political elements into experimental teaching, making experimental teaching an important practice place of ideological and political education.

## 1. Introduction

University laboratories are important bases for scientific research and teaching practice. As we all know, experimental teaching has more advantages than theoretical teaching in terms of comprehensiveness, intuition, practicality, exploration and inspiration. Experimental teaching in colleges and universities is the main channel for students to carry out innovative research, which can stimulate students' innovative thinking ability. In college teaching, experimental teaching, as an important part of it, can effectively cultivate college students' logical thinking ability, hands-on operation ability and communication and cooperation ability. As an important part of talent cultivation, experimental teaching in colleges and universities is the key to cultivate students' innovation and entrepreneurship ability and comprehensive practical ability. Under the construction background of "double first-class" and "mass entrepreneurship and innovation", university laboratories are characterized by quantity, scale and variety [1], and its importance is self-evident. Through experimental teaching, students can not only deepen their understanding of basic theoretical knowledge, cultivate their ability to learn and use flexibly and innovative thinking, but also occupy an irreplaceable position in cultivating outstanding talents. At the same time, through experimental teaching, students can experience how to apply their professional knowledge to solve specific problems, experience learning and use, enhance their professional identity and sense of achievement, and finally achieve the same direction of knowledge teaching (experimental purpose) and value guidance (curriculum ideology and politics) of experimental content.

## 2. The present situation of experimental courses in colleges and universities

Experimental teaching in colleges and universities plays a very important role in the whole education system. However, most universities still have many deficiencies in experimental teaching. First of all, some universities do not pay enough attention to experimental teaching. Influenced by the traditional concept, it is believed that experimental teaching is the auxiliary of theoretical teaching. In general, the school, teachers and students do not pay enough attention to experimental teaching, especially students [2]. The students did not realize the complementary role between experimental teaching and theoretical teaching, and did not really deepen their understanding of theoretical knowledge through experiments. Many students only went to experimental classes to get a part of their grades. They were mechanically coping, and lacked the summary of integrating active thinking with practice. Secondly, the experimental courses in most colleges and universities are monotonous and boring, and the experimental teaching mode lacks innovation. At present, the experimental teaching form in most colleges and universities is basically that teachers first teach theoretical knowledge related to experiments in the classroom, explain the experimental steps and requirements or conduct video demonstrations, and students carry out "mechanical" experiments according to the established experimental steps, step by step, and according to the book. The teaching form is too boring and single. The experimental class conducted in this mode has little gain for students, and this traditional teaching lacks the training of students' expression ability, coordination ability and thinking ability. The experimental teaching mode has the disadvantages of "three more and three less", that is, more knowledge is imparted, less ability is cultivated; there are more injection teaching methods and less heuristic teaching methods; there are more passive procedural experiments and fewer active design experiments [3]. In addition, good experimental teaching mode plays a key role in improving students' practical ability, and is also the core work of cultivating professional and technical talents. We can construct a mixed teaching model suitable for experimental teaching. Experimental teaching focuses on cultivating students' ability of independent innovation and hands-on practice. By building a hybrid teaching mode of "online learning+laboratory operation", it is conducive to implementing the application of online open courses in experimental teaching [4].

## 3. Carding the ideological and political elements in experimental teaching

To play the role of ideological and political education in experimental teaching, experimental teachers are required to constantly think and summarize in the teaching process, sort out the ideological and political elements contained in the curriculum, and organically combine them with the experimental content to pass on to students. It is also possible to update experimental teaching methods and design innovative experimental processes, so that the experimental process can not only achieve the goal of "teaching", but also achieve the effect of "educating people", effectively boosting the "three complete education".

### 3.1. Safety awareness and responsibility awareness

In the process of laboratory safety education, colleges and universities integrate and practice the educational concept of "ideological and political curriculum", imperceptibly affect students' safety ideology and behavior, which is of great significance for establishing a high-level laboratory safety education system model. The purpose of laboratory safety education is to realize the organic unity of laboratory safety responsibility and awareness, knowledge and skills, quality and accomplishment by receiving safety education information and habit coordinated cultivation from various channels. Laboratory safety education is to make students fear life and take responsibility bravely through daily education, classroom practice, culture building and other means, which is not only reflected in their

own safety responsibility, but also their sense of responsibility and mission to others and society [1]. The experimental teachers can present the safety education to the students deeply and vividly through the innovative design of the experimental teaching link. For example, safety knowledge can be quickly answered a few minutes before the experimental class starts; it can also simulate the potential safety hazards caused by misoperation; or watch the pictures of safety accidents through video. Experimental teachers can introduce safety education through various and innovative teaching methods, explore and promote the innovation process of the experimental classroom through question based, interactive, case based, discussion based, flipping and other teaching methods, and place safety values education imperceptibly in the process of teaching safety professional knowledge in the laboratory. In a word, let students establish safety awareness, prevention awareness and responsibility awareness within a short period of time in class. Over time, students will form habitual norms and prudence as long as they enter the laboratory or operation site, which is not only conducive to the safe development of other experiments, but also lays a foundation for future work. In addition, some experimental projects themselves have a strong element of responsibility education. For example, the strength, fatigue, wear and other performance indicators of materials will be measured in the "Mechanical Properties of Materials" experiment, but the strength of materials does not meet the standard, or there are many serious accidents caused by fatigue, which can be properly introduced to students to enhance their sense of responsibility and responsibility for related work in the future.

### **3.2. Innovative thinking and scientific research accomplishment**

Experimental teaching is the "main battlefield" of hands-on practice and the "practical place" of flexible application of classroom knowledge. Having a good experiment class is an important way to comprehensively improve the practical ability, scientific research literacy, innovative thinking and ability to solve scientific problems of college students in the new era. Infiltrating ideological and political education in experimental courses can enhance students' self-confidence and professional identity in scientific research in the future. Students can experience themselves in experiments, combine theoretical knowledge with actual needs, and solve scientific problems and social pain points. They understand that divergent thinking and innovation awareness are required, and they are good at using systematic thinking to find laws and explore the underlying mechanism behind experimental phenomena [5]. For example, some experimental topics can give experimental requirements and objectives, so that students can reasonably design experimental links independently, predict possible experimental phenomena, causes and solutions by combining theoretical knowledge and consulting materials, and finally get the desired experimental results and analyze them. The whole link involves flexible application of knowledge, innovative experimental methods, rigorous and thorough experimental plans, and the ability to solve practical problems in the face of various problems in the experiment, which is a test of comprehensive quality. Teachers are the enlighteners, guides and puzzle solvers of this process, and students are the leaders of the experimental projects. Compared with the traditional experimental courses, I believe that students and teachers will be greatly improved in this experimental process, and students' innovative thinking will be given the best play. It is also a kind of exercise for students who are going to graduate school in the future.

### **3.3. Professional quality and craftsmanship**

The experiment is a very rigorous, careful and meticulous process. The experimenter must not be slack and careless in the experiment process, otherwise, the ideal experimental results will not be obtained. When recording, analyzing and processing experimental data, students are required to adhere to the scientific attitude of "seeking truth and being pragmatic", develop a rigorous and meticulous work style, and treat the experimental results rationally [6]. Inheriting and carrying

forward the "craftsman spirit" among the experimental teachers in colleges and universities will help to enhance the effect of practical teaching, deepen the reform of practical teaching, and cultivate high-quality application-oriented talents. "Craftsman spirit" is highly consistent with the professional values of college experimental teachers. Cultivating a large number of modern laboratory "craftsmen" with the spirit of dedication, dedication, excellence and innovation is an important way to achieve the professional development of college experimental teachers. [7] The rigorous attitude during the experiment also lays a foundation for future work, especially for the cultivation of students' "craftsmanship spirit". College students, as future engineers, engineering scientists and leaders leading the development of science and technology in the future, should cultivate a group of social backbone with "craftsmanship spirit", excellent professional ethics and rigorous scientific spirit while imparting professional knowledge in engineering courses. For example, most engineering colleges and universities will have "engineering training" link. Our school will arrange students to make a small hammer by hand, including design, machining, heat treatment and other processes. Experimental teachers can infiltrate the "craftsman spirit" bit by bit into the teaching link in the whole training process, learning the ancient craftsman's dedicated and persistent work attitude and the professional ethics of "sharpening a sword in ten years"; We should learn from the craftsman's innovative spirit of striving for perfection and innovation, and learn from their noble qualities of hardworking and selfless dedication. In this way, students can not only make a delicate hammer, but also give it a "soul", which is a work display and a spirit. Craftsman spirit, professional ethics and scientific spirit are the necessary qualities for future professional posts. Through the process of experimental teaching, the craftsman spirit of students is gradually infiltrated and cultivated, which plays an important role in promoting college students to adapt to their jobs and their career development in the future.

### 3.4. Overall awareness and team spirit

The so-called team spirit, specifically, is the sense of overall situation, the spirit of cooperation and the spirit of service. With the continuous progress of the society, the social division of labor is gradually refined, which requires efficient communication and cooperation between people, mutual understanding and interdependence. Everyone should learn to understand the overall situation and cooperate in solidarity, so as to adapt to the social development environment. Experimental teaching is a good practice base for introducing team cooperation. Designing the experimental link into team teaching will effectively exercise students' sense and ability of team cooperation. Some experiments in experimental teaching in colleges and universities require students to complete independently, and some experimental projects require students to complete in groups. For example, in the course of "Metallurgy and Heat Treatment", students are required to complete the experiment of "Carbon Steel Heat Treatment Operation and Hardness Measurement". Students complete the process of "annealing, normalizing, quenching and tempering" in groups and measure the hardness of samples, and finally summarize the influence of heat treatment process on material hardness. It can be seen that the experimental process completed in groups is an exercise of students' comprehensive quality. When the experimental task is assigned, the group leader shall coordinate the members to assign tasks, and the members shall cooperate with each other to complete the experimental operation, and finally summarize the experimental results. The experimental results of the group also affect the summary of the experimental results of the whole class. During the experiment, we discussed, pointed out, helped and encouraged each other, from which we learned unity, cooperation, trust, love and the sense of overall situation. From the perspective of their own development, college students should also attach importance to the cultivation of team spirit and cultivate a comprehensive and excellent reserve force with all favorable conditions.

## 4. Conclusion

Experimental teaching is an important part of college education. It plays an important role that classroom teaching cannot compare with. It can not only exercise students' practical ability, but also play its unique role in ideological and political education. Experimental teachers should constantly think and summarize in the teaching process, deepen the summary of the ideological and political elements contained in the experimental curriculum, and then combine the ideological and political elements with the experimental content in combination with innovative teaching forms and teaching methods to play the role of experimental teaching in ideological and political education.

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