

# Research on the Reform of Experimental Teaching of Environmental Engineering by Integrating Curriculum Ideologies and Politics

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**Abstract:** Ideological and political work should be carried out throughout the whole process of education and teaching to realize the whole process of educating people and all-round educating people. Environmental engineering experiment is an important discipline in environmental practice, through the establishment of experimental teaching the whole process of course ideology and politics of the method mechanism, change the teaching mode, enhance the level of teacher course ideology and politics of the way, so that the experimental course ideology and politics of the real realization of the role of education, and more robust socialist direction of schooling.

**Keywords:** Civic-mindedness in the Curriculum, Environmental Engineering Laboratory, Reform of the Teaching Profession.

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## 1. Introduction

In order to thoroughly implement the spirit of the Ministry of Education's "Guidelines for the Construction of Ideologies and Politics in Higher Education Programs" and other documents. Ideological and Political Affairs in Courses integrates Xi Jinping's thought of socialism with Chinese characteristics in the new era, socialist core values, Chinese outstanding traditional culture, and vocational ideals and morals into all aspects of course teaching.

Xi Jinping emphasized at the national conference on ideological and political work in colleges and universities that it is necessary to insist on making the establishment of morality and nurture people as the central link, and to carry out ideological and political work throughout the whole process of education and teaching, so as to realize the whole process of nurturing and all-around nurturing of people. Schools are the front line of ideological work. To use classroom teaching as the main channel to enhance the affinity and relevance of ideological and political education, to meet the needs and expectations of students' growth and development, all classes should keep a good section of the canal, planting a good field of responsibility, so that all kinds of courses and ideological and political theory courses in the same direction, to form a synergistic effect. It is necessary to further improve teaching methods, promote the application of case teaching in the school curriculum ideological politics, strengthen the sharing of experience in curriculum ideological politics, and enhance the quality of curriculum ideological politics.

Since the reform and opening up of the country, the national economy has developed rapidly, thereby neglecting the protection of the natural ecological environment, leading to environmental problems that have caused great harm to the country and the health of the people. With the continuous growth of the national economy, food, clothing, housing and transportation issues have been basically resolved, then the need for more beautiful ecological environment and high-quality ecological products, the ecological environment is the

party and the country urgently need to solve the major livelihood issues. In the party's twentieth report pointed out that "promote green development, promote the harmonious coexistence of man and nature" shows that the country is still trying to manage the environment, on behalf of the country needs a lot of environmental management personnel. Environmental engineering as the main solution to the environmental problems of powerful disciplines, research content is mainly how to protect and rational use of natural resources, to use scientific means to solve the increasingly serious environmental problems, improve environmental quality, promote environmental protection and social development, is the study and prevention of environmental pollution and improve the quality of the environment of science and technology. Among them, environmental engineering experiment is a very important discipline in environmental practice, in the teaching of environmental engineering experiment, cultivate students' scientific spirit and innovation consciousness as well as clearly set up and practice socialist core values, also become a key part of the teaching reform of the experimental ideology and politics course nowadays.

## 2. Deficiencies in Experimental Teaching

In the environmental engineering professional experimental teaching, students in addition to mastering the basic experimental skills, large-scale instruments, wastewater waste gas solid waste and other treatment equipment, the basic principles and experimental data recording, processing, but also to strengthen the students as environmental workers sense of responsibility, sense of honor, national sentiment scientific spirit and other comprehensive qualities of cultivation, so as to improve the quality of experimental teaching in the environmental engineering profession, and to lay a better foundation for the students to engage in the future of the work related to environmental engineering .

At present, there are still some problems in the environmental engineering laboratory teaching,

"environmental engineering laboratory" teaching in the ideology of human education, there are many deficiencies, in which the course of the ideology of political elements are very lacking. The main performance is as follows:

(1) Textbook materials lack elements of Ideologies and Politics. Existing teaching materials are generally based on the specific requirements of the experiment, specific operational steps and the problems that should be noted in the experiment, and there is no elaboration on the potential safety hazards that may exist in the process of the experiment, and so on.

(2) Lack of integration of Civic and Political elements in the teaching objectives and syllabus, in the past teaching objectives teachers often tend to let students only learn the operation of experimental methods, thus ignoring the cultivation of the true spirit of scientific research, such as the spirit of truth-seeking, the spirit of research, the spirit of hard work, the spirit of improvement and innovation, and other spirit of political ideology.

(3) Teaching purpose deviation, in order to save time, pay attention to safety as well as improve the success rate, many experiments before the beginning of the relevant teacher will prepare the reagents needed in the experiment, as well as demonstrating the operation of the experimental apparatus, ignoring the background of the experiment as well as the spirit of the experiment that really want to let the students to learn in the experiment, repeating the experiment according to the standard experimental steps limits the students' sense of independent learning, and is easy to make the students form a fixed mindset, the It is impossible to cultivate their creativity and spirit of exploration. Many students also appear in the operation process attitude is not rigorous, the pursuit of experimental success at all costs to fabricate experimental data, do not reflect on the failure of the experiment, these behaviors also lead to a lot of students in the experiment after the completion of the experiment will be thrown away, not conducive to their experiments with the reality of the lack of awareness of service to society.

### **3. Establishment of a Mechanism for Ideologies in Laboratory Teaching Programs**

The methodological mechanism of the whole process of experimental teaching course of political thinking

The course objectives and experimental content are optimized to determine the syllabus, which makes certain requirements for teachers to consolidate their own political theory, enhance their own academic skills, update their professional knowledge system, use the thinking and methods in line with contemporary education to discover new teaching modes of professional courses, and use broad scientific and cultural knowledge to guide students to organically link the teaching of professional courses and future career development, in order to help students establish correct professional ideals and morals. Because the key to the success of the implementation of the Civic Politics of the curriculum lies in the teachers, not only require teachers to have a wealth of professional knowledge, but also require teachers to always keep the awareness of moral education in mind, but also require teachers to be able to use appropriate methods in the process of teaching to teach the professional content and the Civic Politics of the elements of the organic combination of.

In-depth excavation can be combined with the "Environmental Engineering Experiment" course of the Civic and political elements, follow the laws of education and teaching, put forward the concept of the integration of the Civic and political elements and the professional knowledge of the environmental engineering experiments, the cultivation and shaping of values in the form of implicitly through the teaching of the beginning and the end of the process of education to achieve the ultimate goal of the whole process of educating people in a holistic manner. Therefore, combining the course characteristics of "Environmental Engineering Experiment" with the depth of the organic integration of appropriate elements of nurturing will promote the smooth convergence of knowledge transfer, ability cultivation and value leadership in the course teaching, and will also be conducive to the effective performance of the function of peer-to-peer and synergistic nurturing between the courses.

In the early stage of experimental work, safety education for experiments can be carried out, and "Laboratory Safety Education and Environmental Protection" can be offered, which is set at 16 credit hours. In the safety education should be integrated with the ideology, the course should be all-rounded to join the ideology elements, integrated layout, classroom teaching content optimization, that is, the integrated consideration of the intrinsic connection and logical relationship between the ideology elements and professional knowledge, the different elements of the ideology and politics organically integrated into the different experimental teaching classroom, give full play to the value of shaping the characteristics of implicit education, to achieve the effect of the spring breeze and the rain and the silent effect.

Teachers can use relevant activities for effective integration of the two. For example:

(1) Regular seminars, regular discussions on the content of experiments attended by industry experts. Determine the experiments that are more important or can learn more knowledge from the relevant series of experiments as well as the related more details and precautions that should be paid attention to.

(2) Clear teaching objectives, professional competence and humanistic sentiment, scientific rigor and critical spirit cultivation, social responsibility and professional conduct and academic ethics to establish.

(3) Evaluation mechanism: to strengthen the interaction between teachers and students, most of the current experimental teaching mode is "teachers teach experimental principles and methods - students operate - submit the experimental report", the student's performance is mainly through the checking of the experimental report to achieve. The problems encountered by students in the experiment are not reflected in the experiment report. The lack of teacher-student interaction mechanism prevents students from shaping a sense of responsibility for the environmental protection cause, the concept of ecological civilization, the spirit of dedication, a rigorous learning attitude and the craftsmanship of excellence.

In addition, the experimental report should reflect the experimental links, and the corresponding elements of the Ideologies of each link. Such as in the sampling, may go to the cesspool or go to some of the environment is relatively dirty and poor place for sampling, which trains the students of hard work and endurance; In addition, in the process of

doing experiments, even after the teacher's guidance will still appear a variety of problems which can also exercise cooperation between students, mutual help and the face of the problem of the quality of the courage to climb and explore.

#### **4. Implementation and Effectiveness Evaluation of Ideologies in Laboratory Teaching Programs**

The mission of the professional laboratory course of environmental engineering is to enable students to master the necessary experimental skills, the use of instruments and equipment, and to cultivate the ability to analyze and solve practical problems as well as innovative skills. Professional experimental courses need to realize the combination of "preaching" and "teaching" to cultivate students' national sentiment, professional ethics and scientific spirit. Environmental engineering experiments mainly include environmental monitoring experiments, environmental engineering principles experiments, water pollution control engineering experiments, air pollution control engineering experiments, solid waste treatment and disposal engineering experiments, environmental chemistry experiments, environmental engineering microbiology experiments. The experimental teaching course Ideologies should be centered on the professional teaching content, but also to carry out Ideologies content teaching. Civic and political content of the course should be effectively combined with professional knowledge, that is, professional knowledge as the main line, the content of the Civic and political content as a branch line, the two organic integration, complement each other.

This paper takes the environmental monitoring experiment as an example to explain how to integrate the courses. Environmental monitoring is the basis of environmental protection work, is the most basic means and technology for environmental pollution prevention, planning and management. "Environmental monitoring experiment" is the practical expansion of the theoretical course "environmental monitoring", through the development of specific monitoring programs, sample collection and preservation, sample pre-treatment, sample measurement methods and method selection, analysis of results and other aspects of the operation of the study, to further strengthen the theoretical knowledge of environmental monitoring. Further strengthen the mastery of the theoretical knowledge of environmental monitoring, and better serve the cause of environmental protection. In the learning process, condensing the theme of ideological and political education, from the professional and ideological education to improve the quality of students, which is more conducive to cultivate the ideological progress as well as environmental protection skills solid high-quality environmental protection talents, serving the construction of beautiful China.

First of all, we can combine the experience of laboratory management in teaching, using typical cases of laboratory safety accidents to let students understand the fragility of life and the preciousness of life; through the explanation of real cases of environmental pollution at home and abroad, so that the awareness of environmental protection is rooted in the bottom of the heart of every student; through the introduction of laboratory rules and regulations and the serious consequences of violating the rules of the explanation, so that the students will profoundly understand the importance of abiding by the rules; through the demonstration of the

explanation of the design of experiments, material handling, instrumentation, data analysis, and the results of the validation of the norms, and urged to cultivate the rigorous and realistic, dedicated to the attitude of academic research.

Secondly, in terms of teaching content, the course is fully explored with "green water and mountains", "ecological civilization", "sense of responsibility for environmental protection", "experimental hazard prevention and control ability", "craftsmanship", "truth-seeking and pragmatic" and other materials compatible with the ideology and politics into the teaching process. prevention and control ability", "craftsmanship", "truth-seeking and pragmatic" and other materials compatible with the ideology and politics, and integrated into the teaching process. In terms of teaching methods, through the introduction of Ideologies and Politics elements involved in different experiments, students can practice the concept of "green water and green mountains are golden silver mountains" in specific experiments. For example, through the monitoring of water quality indicators (chroma, turbidity, acidity, alkalinity, hardness, heavy metals, organic matter, etc.), air pollution indicators (NO<sub>x</sub>, PM<sub>2.5</sub>), solid waste leaching toxicity, soil heavy metal pollution, and food safety, etc., we cultivate students to establish the beliefs of "green mountains and green waters," "ecological civilization" and so on. civilization" and other beliefs. In the monitoring experiments, titration, colorimetry, digestion, leaching and other experimental procedures are involved, and each subtle link will affect the reliability, accuracy and precision of the experimental data. Therefore, through these subtle experimental operations, students are trained to understand that effective monitoring data is not easy to come by, which in turn guides students to establish a "pragmatic" attitude and "excellence" of craftsmanship. In addition, students are guided to analyze and summarize the problems of experimental operation and data processing, and through the case of "monitoring data falsification", they are strengthened with correct experimental operation skills and the significance of scientific processing of experimental data, so as to cultivate students' "truth-seeking and pragmatic" and "scientific rigor", "scientific rigor".

Students work in groups to complete the search for information, determine the program, analyze the experimental report, report in the form of a group, a comprehensive understanding of the concept and division of ecological functional zones, the collection of surface dust and the principle of mastering the determination of the content of heavy metals and the principle of the regional ecological construction policy development and rational environmental remediation provides the basis for targeting. Improve students' innovative thinking and practical ability, improve students' ability to master knowledge, cultivate students' scientific attitude of seeking truth from facts, indomitable working style, team spirit of mutual cooperation, and innovative consciousness of pioneering. Through the development of these experimental programs, the school will be conducive to the cultivation of high-quality, innovative talents needed by society.

Compare and contrast the influence of different teaching methods on the effectiveness of the course of Ideologies and Politics, and choose the appropriate teaching mode to realize the improvement of teaching effect according to the local conditions. Improve the course assessment system to organically incorporate the Ideologies education into the

syllabus, a set of scientific, reasonable and effective evaluation system plays the role of feedback, guidance and motivation.

At present, the laboratory report is the main basis for environmental engineering laboratory assessment and evaluation, reflecting the students' knowledge and ability to master the principles of unit operation. However, it is difficult to reflect the students' moral education quality only through the evaluation of lab reports. We will take the Ideologies summary perception as the evaluation method of Ideologies learning, which is included in the overall assessment and evaluation standards, thus integrating the knowledge and ability and moral quality evaluation to make up for the lack of Ideologies learning evaluation. At the same time, the Ideologies summary perception of the teacher's course Ideologies teaching quality play a good role in feedback, help the course Ideologies teaching continuous improvement.

## 5. Teaching Practice and Reflection

At present, the environmental engineering experimental Ideologies teaching reform has just begun to teaching performance has now received some results, a change in the dullness of the past and the teacher's unilateral output, the students are more actively involved in the classroom, the relationship between the teacher and the students has also been a great improvement in the experiments encountered will not be able to ask the teachers to teach their classmates to increase their knowledge, but also to improve the hands-on ability. However, the reform of Ideologies is a complicated project that needs to be persisted for a long time, we need to keep exploring in the process and improve and solve the problems little by little.

(1) Although the integration of Ideologies and Politics with the curriculum is being popularized nowadays, there are still some teachers who are not aware of the importance, and are not positive and active in their teaching objectives and behaviors.

(2) Civic politics in the curriculum requires a high level of political literacy from teachers, but because teachers have been engaged in teaching specialized courses for a long time, they lack knowledge of ideology and politics, and they do not have enough skills to integrate knowledge of specialized courses with the Civic Politics curriculum, and they cannot master the relevant skills in a short period of time, which will lead to a relatively rigid entry of Civic Politics content, and the expected effect is far from the expected results.

(3) The integration of Civic and Political Education requires a lot of time to redesign, which may be different from the previous teaching objectives, greatly increasing the workload of teachers, making them under pressure and thus less excited.

(4) In the environmental engineering experiments, there are a lot of content is more complex and cumbersome experimental procedures, relatively few hours, the teacher in the prescribed class time to complete the teaching task is more difficult, no time and energy to change the original teaching mode.

(5) Some students do not fully recognize the inclusion of Ideologies elements in their major courses, the original experimental steps have been very complex, in the addition of part of the ideological and political education content, for some students it is "worse", the students are more inclined to

take advantage of the limited time to do experiments, to participate in the activities of the competition and publish articles and so on more involved in their own interests, so the motivation is relatively low, so the students are not interested in the experiments. Students prefer to use their limited time to do experiments, participate in activities and competitions, and publish articles and other things that are more related to their own interests, so the enthusiasm is relatively not high.

Although there are still some problems in the reform of environmental engineering experimental course Ideologies and Politics teaching, but this is an inevitable requirement for realizing the fundamental mission of higher education to cultivate moral integrity., this reform is carried out well or poorly in relation to the future of the country's people, related to the realization of the great rejuvenation of the Chinese nation, So no matter what kind of difficulty exists, it should be firmly persevered . It is believed that these problems will be solved one by one with the continuous advancement under the general situation of the integration of national curriculum Ideologies and Politics.

## 6. Conclusion

The connotation of experimental courses in colleges and universities can not only be limited to enhance students' theoretical and practical ability and innovation consciousness training, but more importantly to help students build values and the ability to distinguish right from wrong, so that students consciously practice experimental activities from within the requirements and ethical standards. Enhancing the affinity of experimental teaching course ideology and politics is to continuously explore the integration point of experimental teaching and ideological and political education, through building the affinity of experimental teaching environment, enhancing the affinity of experimental teaching content and enhancing the affinity of experimental teaching faculty, so that experimental course ideology and politics can truly realize the role of education and more steadily take the direction of socialist schooling .

In the environmental engineering experiments to add appropriate elements of political thinking, at the same time on the establishment of students' correct values, outlook on life, world view paly a very important role, but also enable them to learn the knowledge effectively into practice, so as to gain more. Combining the characteristics of the experimental project, using all the teaching links and optimizing the teaching process is conducive to the normalization of Civic and Political education, and the implementation of the fundamental task of cultivating morality and nurturing people in a subtle way.

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