

How to Integrate Ideological and Political Education Into Physics Teaching

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Abstract

Teaching and educating people is an important task of school work, in which ideological and political education is an important part of moral education. With the continuous deepening of the reform of the national new curriculum standards, how to integrate "Ideological and political education" into the teaching of professional courses has gradually become a hot and key issue of great concern to educators. Physics is the reflection of the objective laws of nature. It is not only restricted by dialectical materialism, but also provides a large number of examples for dialectical materialism. Based on a large number of references, this paper explores how to add ideological and political education to physics teaching, and expounds the practical application of Ideological and political education in Physics Teaching in detail. The research content mainly involves the application of Ideological and political education in physics teaching, and on this basis, it explores the methods and Strategies of infiltrating ideological and political education into physics teaching with examples.

Keywords

Ideological and political education; Physics teaching; Methods.

1. Introduction

1.1. Research background

1.1.1. Emphasis on Ideological and Political Education

In 2014, moral education was included in the important project of comprehensive education reform. In 2019, the general office of the CPC Central Committee and the general office of the State Council issued several opinions on deepening the reform and innovation of the ideological and political theory course in schools in the new era, which pointed out that education is the great plan of the country and the party, and undertakes the fundamental task of Building Morality and cultivating people. Ideological and political course is the key course to implement the fundamental task of Building Morality and cultivating people, and plays an irreplaceable role. The opinions on strengthening and improving ideological and political work in the new era issued by the State Council in 2021 pointed out that ideological and political work is the party's fine tradition, distinctive characteristics and outstanding political advantages, and is the lifeline of all work[1]. All these show that the state pays more and more attention to the ideological and political education of students. Based on the above analysis, this paper chooses the exploration and discussion of Ideological and political education in physics, and pays attention to how to carry out students' Ideological and political education in physics.

1.1.2. Characteristics of Ideological and political education in Physics

Ideological and political education in different disciplines will present different characteristics. Physics is a natural science that studies the basic forms, basic properties and laws of motion, change and interaction of matter with the objective material world as its object. It contains the

basic methods of observing and understanding the world and the resulting scientific theory, which is permeated with the views and methods of dialectical materialism[2]. The ideological and political education in physics pays attention to the combination of dialectical materialism education and patriotism education with the progress of physics teaching, and trains students to look at and solve problems with the perspective and method of dialectical materialism, gradually form the scientific world outlook of dialectical materialism, and master the scientific method of recognizing the world. Pay attention to cultivating students' strong interest in physics, realistic and serious scientific attitude, the spirit of independent thinking and innovation, the excellent quality of hard study and active exploration, enhance students' national pride, form students' correct idea, and cultivate excellent socialist builders and successors.

1.2. Purpose and significance of the study

The Physics Syllabus clearly points out that "in physics teaching, we should carry out ideological education for students, mainly dialectical materialism education and patriotism education.[3]The development of Ideological and political education in physics teaching is determined by the purpose of middle school education, which is clearly required by the Physics Syllabus, and is also the fundamental requirement of the society for school education. In the process of physics learning, students can not only establish correct physical thinking and scientific attitude, but also form dialectical materialism and indomitable strong will, and enhance patriotism. Teenagers are the builders and successors of the motherland in the future and the pillars of the country in the future. The country will be taken over by teenagers with all-round development of morality, intelligence, physique, art and labor. China will be more prosperous and prosperous.

1.3. Research contents and methods

1.3.1. Research content

This paper focuses on the methods and Strategies of Ideological and political education in physics teaching, combined with the characteristics of physics, to cultivate students' correct ideas and attitudes. In terms of content, firstly, the methods of Ideological and political education in physics teaching are divided into two parts according to their characteristics. Secondly, different education methods are discussed for each part, and specific introduction is made with examples. Finally, the research of this paper is explained and summarized.

1.3.2. Research methods

In order to ensure the authenticity and reliability of the text content, this paper selects the literature research method according to the problems studied in this paper and the actual situation. By combing and summarizing the books and papers on the research of Ideological and political education in physics teaching, this paper analyzes the characteristics of students' psychological development, summarizes the characteristics and current situation of middle school physics education, and makes a more in-depth study by borrowing the experience of predecessors in this research direction.

2. Making Full Use of Classroom Teaching to Do Well in Ideological and Political Education

2.1. Explore the hidden ideological and political education resources in the classroom

Classroom teaching is a bilateral activity composed of teachers and students. It is not only the process of teachers' imparting knowledge, but also the process of building a good relationship between teachers and students. It is the main way for teachers' teaching and students' learning.

Ideological and political education in the classroom is the main way to improve students' Ideological and political quality.

First of all, teachers' words, deeds and every move are under the supervision of students. It is the so-called teaching by example. Teachers' words, deeds and ideas will have a subtle impact on students' morality and behavior habits. Those who cultivate others must cultivate themselves first, and only those who establish themselves can establish themselves. Teachers should insist on improving their own ideas and knowledge, set an example, and use their words, deeds and thoughts to guide students to form positive ideas and attitudes. Secondly, the ideological and political education in the physics classroom can not be divorced from the physics knowledge and empty persuasion. We should take physics teaching as the center and infiltrate the ideological and political education into the physics classroom. The textbook contains not only explicit educational resources such as professional basic knowledge, but also implicit educational resources such as students' thoughts, attitudes and thoughts. Teachers should fully tap the resources of Ideological and political education hidden in textbooks, find the connection between them and professional knowledge, thoroughly analyze textbooks, and combine knowledge teaching to make the content of Ideological and political education imperceptibly enter students' minds. Finally, teachers should update the classroom structure, and take different angles and ways to study teaching in the same course, so as to achieve the best learning effect. In teaching, we should pay attention to mobilize the enthusiasm of students, build a good relationship between teachers and students, let students learn knowledge in a good and positive classroom atmosphere, and pay attention to guiding students at the spiritual level, so that students can feel the atmosphere of friendship, so as to help students form healthy psychological quality and moral concepts. The hidden ideological and political education resources in the classroom are the supplement of the dominant ideological and political education resources. Only by fully exploiting the hidden ideological and political resources in the classroom can we better and more fully carry out the ideological and political education for students.

2.2. Explain the history of physics and set up students' lofty ideals

China is an ancient civilized country, which has played a great role in promoting the development of physics. The history of physics in China contains rich materials for ideological and political education. The history of physics is the integration of science and humanities. It contains not only dialectical materialism, but also ideological and moral education and scientific attitude[4]It contains the generation of many physical concepts, the discovery of laws, the derivation of formulas, and is full of a series of scientific world views and dialectical materialism methodology. In addition, the history of physics contains many heroic deeds of physicists' sacrifice for scientific research, scientists' path to success and values, etc., which are important resources for students' Ideological and political education.

Teachers should pay attention to explaining the history of physics to students in teaching. They can use modern scientific and technological means such as multimedia or multi-functional classrooms to create teaching scenes. They can not only let students understand the history of physical development, the formation process of physical concepts and formulas, but also let students experience the experience of some physicists, cultivate students' good sense of innovation, and help students form dialectical materialist thinking, Use the heroic deeds of scientists to stimulate students' patriotic feelings and help students establish lofty ideals and the excellent quality of being indomitable and not afraid of difficulties. For example, in the process of introducing knowledge such as "Oster's small magnetic needle deflection experiment", "the creation of Newton's law of motion", "Coulomb torsion balance experiment", teachers lose no time in educating students, letting students understand the discovery and creation process of these knowledge, and cultivating students' scientific consciousness of

seeking truth and innovation[5]Let students learn to look at and solve problems from the perspective of dialectical materialism. Every scientific invention and discovery is inseparable from the efforts and painstaking efforts of scientists for many years. Teachers can also appropriately introduce the efforts and achievements of Chinese scientists after the founding of the people's Republic of China, their anecdotes, academic experience, the path to success and values, etc. For example, "the father of Chinese missiles - Qian Xuesen": he was born in a scholarly family and received a comprehensive and systematic family education from an early age. In the face of the weak situation of the times, he was determined to learn knowledge well, master advanced science and technology, and serve the motherland with scientific and practical work. During his study abroad, in order to return to the motherland as soon as possible and contribute all his strength to the construction of new China, he was determined to give up all preferential treatment in the United States. Unexpectedly, he was involved in the whirlpool of crazy anti Communist and persecution of progressives in the United States and was illegally detained. In this regard, he did not give up and continued to fight. Finally, with the diplomatic efforts of the Chinese government, he returned to his hometown. In order to realize the dream of becoming a powerful country, he devoted his whole life to the cause of science, devoted himself to the cause of death, made efforts to give full play to his intelligence, paid attention to innovation, actively trained successors, and devoted all his efforts to the prosperity and strength of the motherland. By explaining the achievements and patriotic deeds of Chinese scientists, we will cultivate students' spirit of hard work, national pride, family and country feelings and social responsibility, guide students to combine their own ideals with the ideals of the country, always keep the country in mind, and contribute to the prosperity of the country.

2.3. Strengthen experimental teaching and train students' creative thinking

Physics is a subject based on experiments, with strong scientificity, practicality and operability. Therefore, experimental teaching plays a very important role in physics teaching. Experimental teaching can not only help students form physical concepts, understand and consolidate physical knowledge, improve students' ability to observe phenomena, analyze problems and solve problems, but also cultivate students' realistic and serious scientific attitude[6]Perseverance is an essential way to improve students' comprehensive ability, train students' creative thinking and carry out ideological and political education. The fundamental purpose of experimental skill training and ideological and political theory training is the same. Both are to improve students' comprehensive quality, promote students' all-round development, and cultivate builders and successors of the socialist cause with all-round development of morality, intelligence, physique, art and labor.

First, teachers can join the ideological and political education before the experiment. It can not only let students sort out the principles, methods, experimental conditions and experimental keys used in the experiment, guide students to establish the consciousness of "everything is established in advance, and not abandoned in advance", but also let students find the historical background and the story of scientists related to the experiment through the network, library and other ways, so as to stimulate students' patriotic feelings of studying hard and climbing the scientific peak. Secondly, teachers can join the ideological and political education in the experimental process. Students' dialectical thinking can be cultivated by explaining the experiment. For example, when explaining the mechanical experiment of "three line pendulum", teachers can help students establish a sense of contradictions inside things and learn to look at problems from the perspective of unity of opposites by explaining acceleration and deceleration, synthesis and decomposition[7]. Finally, teachers can join the ideological and political education after the experiment. After finishing the experiment, let the students summarize in time, review the advantages and disadvantages of their own experiments, let the

students understand the importance of summarizing and summarizing, improve the students' ability to analyze things, and form a realistic, scientific and rigorous style.

3. Actively Carry Out Extracurricular Activities for Ideological and Political Education

3.1. Increase interesting extracurricular activities to improve students' comprehensive ability

In addition to classroom teaching, carrying out extracurricular activities is also an important way of Ideological and political education. Rich and interesting extracurricular activities are activities that integrate interest and science, and put innovative thinking and ideas into practice. Students' extracurricular activities can not only greatly stimulate students' interest in physics, but also combine the professional knowledge in textbooks with practice to improve their practical ability and logical thinking ability, which is conducive to cultivating students' rigorous scientific style, realistic scientific attitude, innovative thinking and innovative skills.

First of all, teachers can organize students to visit science and technology exhibitions, watch experimental performances, etc., and explain some physical principles of scientific and technological production to students while watching. This can not only help students review and memorize the basic knowledge they have learned, deepen their understanding of knowledge, but also lead students to explore unknown fields, help students enrich their knowledge system, and the new learning environment can also greatly improve students' interest in learning, arouse students' happiness, satisfaction Love and other rich emotions enable students to study actively and make students become the main body of learning. During the visit, teachers can also insert some achievements in science and technology in China, cultivate students' sense of national pride and social achievement, establish lofty ideals, and strengthen students' Ideological and political education. For example, after explaining the "principle of camera", teachers can organize students' Extracurricular shooting activities to make students more deeply understand the principle of camera. Secondly, teachers can lead students to carry out some small scientific and technological inventions and small physical production, combine the basic knowledge learned with practical operation, and improve students' practical ability. For example, lead students to carry out experiments such as "paper hot pot", "water rocket" and make periscopes. Let students really participate, so that students can understand more about scientific and technological knowledge, mobilize their enthusiasm for learning, from passively accepting knowledge to actively exploring the principles, so as to love physics and science and technology. Finally, the school can carry out activities such as reading scientific and technological articles to discuss and publish the gains obtained from the articles in groups, so as to enhance students' sense of team experience, promote students' awareness of unity and cooperation, and expand students' divergent thinking ability. Students' professional basic knowledge mainly comes from textbooks, but the expansion of knowledge comes from extracurricular reading and personal experience. Extracurricular activities are not only a supplement to classroom teaching, but also an extension of classroom teaching. Only by combining classroom teaching with extracurricular activities can teachers improve students' interest in learning, guide students to observe and practice, analyze and solve physical problems, provide students with the ability to understand, master and apply knowledge, improve their innovation consciousness, and give full play to students' subjective initiative[8].

4. Focus on Different Methods According to The Actual Situation

4.1. Current situation and solutions of junior high school physics ideological and Political Education

Professor Wang Qing of Tsinghua University believes that there are three levels of improvement in the ideological and political course in turn: for example, salt in sand simply adds professional courses and ideological and political elements; for example, salt in water organically integrates professional knowledge and ideological and political elements; the chemical reaction between professional knowledge and ideological and political elements, forming a new idea and a new form of chemical reaction, is the highest level of Ideological and political pursuit of the course, and also the connotation of the most suitable ideological and political course selected by the times[9]. At present, some teachers' understanding of Ideological and political education in China remains in conceptual understanding, and they have not integrated ideological and political education into the curriculum system from the perspective of subject characteristics. At present, there are still various problems and challenges in junior high school physics ideological and political education in China. For example, the phenomenon of "two skins" between curriculum teaching and ideological and political education, teaching and education has not yet been solved, and the phenomenon of labeling and simple "addition" exists in Ideological and political education. Middle school students are in adolescence and early middle school. The content of emotion and emotion is very rich. Their intelligence develops rapidly, and their nervous system is basically mature. It is an important stage for the development of ideals, motivation and interests, as well as a critical period for moral development. Under the implementation of the "double reduction" policy, the burden of homework and extracurricular counseling is relatively reduced, and the time for extracurricular activities is relatively more, which is conducive to the implementation of Ideological and political education.

In view of the current situation of middle school physics ideological and political education in China and the psychological development characteristics of junior high school students, this paper suggests that in the implementation of the above-mentioned methods, the following methods can be adopted: first, excavate the hidden ideological and political resources in the classroom. The key to the ideological and political education of students lies in teachers, whose responsibility lies not only in teaching, but also in educating people. This requires teachers not only to be the porter of textbook knowledge, but also to be the guide to cultivate students' correct ideas and shape students' good morality. Teachers should start from themselves, constantly update their teaching idea, correctly interpret the meaning of Ideological and political education, strengthen their understanding of Ideological and political education, and eliminate ideological misunderstandings. Secondly, we should fully explore the hidden ideological and political education resources and physics professional knowledge in the teaching materials, find the relationship between them, integrate the socialist core values into the physics teaching objectives of middle school, reinterpret the physics knowledge system, optimize the classroom structure, and put an end to the phenomenon of "two skins" between classroom teaching and ideological and political education, labeling and simple addition of the two. Finally, teachers themselves should establish correct values, improve their ideological and political quality, form a friendly relationship between teachers and students, imperceptibly influence in daily life, and set an example for students' Ideological and political education. Second, strengthen experimental teaching and train students' creative thinking. Physics is a subject based on experiments, and the experimental course is a compulsory course in junior high school physics. Strengthening experimental teaching is an important way to improve students' comprehensive ability. Teachers should make full use of experimental teaching to carry out ideological and political education, improve students' practical ability, and cultivate

students' scientific literacy and rigorous style of seeking truth from facts. Third, increase interesting extracurricular activities to improve students' comprehensive ability. Middle school stage is a stage when students are very curious, and it is also an important stage to develop students' interest and establish correct values. Under the implementation of the double reduction policy, junior high school students have relatively more time for extracurricular activities, which is conducive to the development of extracurricular activities. Compared with traditional classroom teaching, interesting extracurricular activities can better stimulate students' interest in learning, and ideological and political education for students in an active and positive atmosphere will get twice the result with half the effort.

4.2. Current situation and solutions of high school physics ideological and Political Education

High school students are faced with the major problem of college entrance examination. There are relatively many courses, which are relatively difficult. Coupled with the impact of examination oriented education in China, there are a variety of problems in high school physics ideological and political education in China. For example, some teachers cannot correctly understand the meaning of Ideological and political education, teaching methods are monotonous, students have little initiative, and ideological and political education is ignored in teaching. High school students' psychology is rapidly maturing, students' self-awareness is enhanced, they have a strong sense of self-improvement, and they are full of longing for the future. Under the heavy curriculum, students' extracurricular activities are relatively less, and students' pressure is also greatly increased.

In view of the current situation of high school physics ideological and political education in China and the psychological development characteristics of high school students, this paper suggests that in the implementation of the above-mentioned methods, the following methods can be adopted: first, excavate the ideological and political resources hidden in the classroom. Striking iron still needs to be hard. Teachers should first start from themselves, correctly interpret the meaning of Ideological and political education, truly understand the significance of Ideological and political education, constantly update teaching ideas, and realize the necessity and importance of Ideological and political education. Secondly, teachers should fully explore teaching materials, find the connection between professional knowledge and ideological and political education, update the classroom structure, and pay attention to ideological and political education. Finally, we should optimize teaching methods, change the traditional single teaching, give full play to students' initiative, arouse students' interest, and be the guide of students' learning. Classroom teaching is the main way for teachers to impart knowledge and carry out ideological and political education. It is inevitable and necessary to make full use of classroom teaching to carry out ideological and political education. The second lecture is the history of physics. High school students are under great academic pressure and have less extra-curricular time, so teachers can focus on the use of time in class, interspersed with the explanation of the history of physics for ideological and political education. High school students' minds are gradually maturing, their self-awareness is enhanced, and they will have their own idea about things. And high school students are in the planning stage for the future direction of life, and they will have a preliminary plan for their own life. Teachers can stimulate students' enthusiasm for scientific research and cultivate students' patriotism by explaining physicists' sacrifices and contributions to scientific research progress and national prosperity, Guide students to combine their personal ideals with social ideals, establish lofty ambitions, clarify the future direction of life, and cultivate students to be a qualified socialist builder and successor.

5. Summary

5.1. Summary of research results

For the research on how to integrate the ideological and political education into physics teaching, this paper is based on the two parts of classroom teaching and extracurricular teaching. Combined with the different characteristics of junior high school and senior high school and the different ideological and political education status of the two physics disciplines, as well as the different psychological characteristics of students, the following conclusions are drawn: in the classroom, teachers can mine the hidden ideological and political resources in the classroom, Explaining the history of physics and strengthening experimental teaching to carry out ideological and political education; Outside the classroom, teachers can carry out ideological and political education for students by increasing interesting extracurricular activities. Junior high school physics ideological and political education can focus on the methods of excavating hidden ideological and political resources in the classroom, strengthening experimental teaching, and increasing interesting extracurricular activities; The high school physics ideological and political education can focus on the method of excavating the hidden ideological and political resources in the classroom and explaining the history of physics.

5.2. Suggestions and Prospects

Ideological and political education and physics teaching are not unrelated, they can promote each other. Integrating Ideological and political education into physics teaching requires the joint efforts of teachers and students. Teachers should not only improve their ideological and political quality and do their own work well, but also carry out relevant training. Students should establish the awareness of Ideological and political education, consciously strengthen ideological and political education, and seriously experience it in the process of learning.

Sukhomlinsky said, "the goal of a wise man is not only to develop and enrich intelligence, but also to form noble morality and beautiful quality". Training students is to prepare for the future successors of the motherland. How to train students is related to the future of the motherland and the future of the country. The development direction of education in China in the 21st century is quality education. One of its important tasks is to carry out moral education for students, and the focus of moral education is ideological and political education. With the widespread attention to ideological and political education, schools are also gradually improving and strengthening the ideological and political education of students. The development of students will be more comprehensive, and the ideological and political quality of students will be gradually improved. Schools will cultivate batch after batch of students with comprehensive development of morality, intelligence, physique, art and labor, and the country will have batch after batch of excellent socialist builders and successors.

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