

Integration of Ideological and Political Education in College Physics Courses Under the Reform of Smart Teaching

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Abstract: The development of the times has prompted China to enhance the quality of education and the value of talent. As guides for students, teachers should conscientiously implement ideological and political education, create college physics courses that are more in line with modern talent cultivation, eliminate the fixed and singular nature of traditional teaching, and find the integration points of ideological and political education. Teachers need to use the textbook itself, the expansion of resources in smart classrooms, and current technological progress to implement ideological and political education in order to cultivate more high-quality and high-level comprehensive talents for society.

Keywords: Smart teaching; College physics courses; Ideological and political education; Implementation strategy

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1. Introduction

In order to ensure the cultivation of more high-quality talents that keep up with the times, China specifically released the “Guidelines for the Construction of Ideological and Political Education in Higher Education Curriculum” in 2020, which provides specific explanations on ideological and political issues, requiring teachers to reflect on current teaching problems and cultivate more comprehensive talents with correct values, social views, and life goals under innovative thinking and current social needs ^[1,2]. Therefore, teachers should carefully explore the content of college physics courses, improve students’ exploration awareness and research and development spirit from the textbook itself and the expansion of information resources, understand how to use practice to meet physics exploration, and thus achieve a two-way improvement of educational level and educational achievements ^[3].

2. The current situation of ideological and political education in college physics courses

2.1. Insufficient awareness of ideological and political consciousness among teachers

College physics, as an important subject, has significant value for both science students and their future

employment development. It involves a wide range of information and is closely related to human life and technological development. In the past, teachers mainly focused on textbook knowledge and neglected practical skills, which is also the biggest drawback of traditional teaching in China ^[4]. Therefore, although many colleges have proposed to integrate ideological and political education into college physics courses, many teachers have not adjusted their teaching concepts and lack awareness of ideological and political education. In addition, surveys have found that some teachers believe that ideological and political education is basically preaching and has little use for physics teaching, which can actually delay students' mastery of professional physics knowledge, leading to a serious lack of infiltration of ideological and political education in college physics courses ^[5].

2.2. Lack of reasonable integration points

Many college teachers are knowledgeable and experienced teachers who have become accustomed to teaching in their own way. They have always held a vague attitude towards new teaching concepts, and this ideology has indeed affected the integration of ideological and political education in college physics teaching. As a result, the integration of ideological and political education in college physics classrooms now presents two situations: one is accustomed to the previous teaching methods and not willing to complete proactive teaching reforms ^[6]; one approach is to integrate ideological and political education into physics courses, but due to the influence of previous teaching and understanding of ideological and political education, many experienced teachers are unable to find better integration points and do not know which theory, sentence, or experimental activity to complete a reasonable introduction of ideological and political education. This has also led to ideological and political education gradually becoming a formal teaching concept, unable to improve students' ideological quality education.

2.3. Relatively single integration method of ideological and political education

Integration of ideological and political education is a new teaching method, which poses certain difficulties for teachers who have long adhered to traditional education. Therefore, many teachers will consider some compromise methods to integrate ideological and political education. The most commonly used method found in surveys is to improve students' exploratory spirit by explaining the background stories of various physicists and scientists and discovering the causes of physical phenomena. Apart from this, there are almost no other ideological and political methods involved. In the beginning, students are indeed full of interest, but the monotonous integration method over time gradually erodes their curiosity and thirst for knowledge, and they are also unwilling to consider the teacher's problems in the classroom, losing the value of ideological and political education ^[7].

3. The starting point of ideological and political education in college physics classrooms

3.1. Long history of physics

Physics can be traced back to the 17th century when scholars relied on intuitive observation and philosophical speculation to complete non-specific physical explorations. However, it was precisely because of the spirit of these scholars that physics led the world's progress and the rapid development of various industries for over 300 years. Among them, there were hundreds of great physicists, including Newton, Galileo, and Max, who used their unremitting scientific research spirit and exploration enthusiasm to create more advanced social development for future generations. These qualities should be worth learning and practicing by every student ^[8].

3.2. Dialectics of materialism

Physics is a discipline that advocates materialism. Behind these great physicists lies the discovery and verification of phenomena, which is infused with a large amount of Marxist dialectical thinking. It not only allows students to feel the great scientific values of scholars but also verifies the materialist ideas through various experimental principles, truly achieving “practice leads to true knowledge.” Through continuous experimental activities and observation of phenomena, students will also understand the character of diligent and serious learning, understand the use of physics knowledge to solve problems, and cultivate their materialist thinking and persistent scientific research attitude ^[9].

3.3. Physicists’ research achievements in national construction

The research achievements of physicists are not only limited to natural ecology and cultural construction ^[10]. With the development of the times and strong national consciousness, there are too many outstanding physicists in China who have devoted themselves to national defense construction and scientific research and development. From Sanqiang Qian, the “Two Bombs and One Satellite,” Xuesen Qian, the “Father of Chinese Missiles,” Jiuzhang Zhao, a space physicist, to China’s manned spaceflight and lunar exploration engineering. These achievements will also inspire students’ patriotism and perseverance, which are the basic qualities that should be mastered in ideological and political education in college physics classrooms ^[11].

4. The implementation strategies of ideological and political education in college physics classrooms under the reform of smart teaching

4.1. Enhancing the ideological and political awareness of the teaching staff

Teachers have an important mission of teaching and educating students. In addition to teaching professional knowledge, they should also start from the perspectives of ideology, morality, political beliefs, etc., to cultivate more high-quality talents with comprehensive development for the new era. Therefore, teachers should first have a positive ideological and political concept, carefully study the quality requirements and life values of students in the social process, and improve teaching activities with modern thinking ^[12]. In addition, schools should utilize school-based teaching and research to encourage each teacher to actively express the integration strategy of ideological and political education, unleash the innovative spirit and discussion value of teachers, and create college physics teaching that is closer to student life and more conducive to student participation. Through textbooks and various practical activities, students can improve their ideological, political, and life values. In addition, when evaluating teachers, the integration of ideological and political education should also be considered as one of the achievements, and the implementation of ideological and political education should be emphasized. Teachers should be guided to continuously break through teaching obstacles, adhere to professional ethics, and cultivate more talents with extremely high quality and professional skills for the development of science and technology in China ^[13].

4.2. Introducing ideological and political elements based on the textbook itself

The college physics curriculum covers a wealth of technological information and physical laws, which are driving humanity towards technological advancement and enabling various industries to establish and develop economic systems. In the process of infiltrating ideological and political elements, teachers should first excavate textbook information and use smart classrooms to present it more intuitively to students, stimulate their thinking and practical interest, and thus establish positive life values and exploratory spirit ^[14]. For example, the beginning of “College Physics” discusses “Newton’s laws of motion and their applications,” and how Newton

discovered universal gravitation and gradually developed into more detailed laws of motion. These are all contents worth integrating into ideological and political education. At this point, teachers can use multimedia to play Newton's life story, stimulate students' interest in learning through real images and the significant impact of these physical phenomena on world development, and understand the beautiful character of "doubt is thinking, thinking is life" from it. In addition, teachers can also present information to students about Newton's theory of particles and Huygens' theory of light waves, as well as Einstein's later re-exploration of the theory of light quanta^[15]. These interesting experimental activities can make students feel the strong spirit of exploration of scientists, and it is precisely because of questioning and practice that the rapidly developing world has been created. Students can deepen their physical thinking under the influence of videos, establish a positive sense of exploration and practical interest, and infuse the scientific spirit of seeking truth from facts into daily learning.

4.3. Exploring the ideological and political values existing in concepts and laws

The laws of physics teaching are the results accumulated by numerous physicists over a long time, and can only be completed through meticulous reasoning and precise experiments. This has invested the patience and years of time of physicists. While explaining the concept of laws, teachers should also explore their ideological and political values, so that students can understand the preciousness of time^[16]. For example, at the beginning of the course "College Physics," the problem of particle mechanics was mentioned, which respectively elaborated on the concepts of reference frame, coordinate system, time, and time. These contents can permeate moral values and political concepts. Teachers can use multimedia to display the youth and passion that various physicists have devoted to scientific research at different times and ages, from this, students are asked, "What are your plans for your future, and what should be your life coordinates?" Under the guidance of physical concepts, students will also associate the development of any event with time. Time is the greatest invention in human existence, marking the cycle of the sun and the moon, and the unforgettable past. They realize how to arrange their time as they are about to enter society and higher education. The process of gradually comprehending the concept of time can greatly mobilize students to cherish time and uphold the moral character of youth, thus thinking and establishing future development plans, and establishing positive life beliefs and values.^[17]

4.4. Utilizing smart classroom to expand students' perspective

The development of the times has brought about tremendous changes in education and teaching, which are also constantly integrating information technology and smart classrooms under big data. In order to ensure that students' thinking can keep up with the times, teachers also need to constantly innovate new teaching goals to expand their horizons, to ensure that students can better adapt to future work and learning. College physics teachers can use both online and offline methods, such as using information technology to search for relevant materials and videos based on the experiments mentioned in the textbook, so that students can still have good physics thinking and reasoning abilities even without the textbook^[18]. For example, when discussing the issue of the Law of Conservation of Angular Momentum, teachers can first ask students about the phenomena of conservation of angular momentum in their daily lives, so that students can establish a good quality of independent thinking and cooperative exploration. Then, teachers can use smart classrooms to display some phenomena, and students should answer "yes" or "no" and explain the reasons. For students who answer correctly, smart classroom integration policies can be implemented, and accumulating enough points can activate the interesting materials of a certain physics knowledge. This kind of interesting classroom can not only stimulate students' classroom interest, but also expand their horizons in rich themes, improve their thinking quality and exploratory spirit, and promote the presentation of prosperous teaching results in college physics classrooms^[19].

4.5. Exploring real physics technology and infiltrating ideological and political education

The economic system and technological development of a country rely on the operation of physical knowledge. For college students who are about to face society, it is even more important to establish positive learning literacy and understand the importance of scientific exploration in ideological and political education. Therefore, in addition to explaining the basic knowledge of textbooks, teachers should also explore ideological and political elements from the perspective of national scientific and technological development, so that students can experience the greatness of physics knowledge under smart teaching. For example, starting from the issue of mobile phones that students are most concerned about, in the past, most mobile phones came from foreign brands, and China's technological development and product research and development were very limited. However, with the advent of the 5G era, China's mobile phone and communication research and development have become one of the few in existence in the world, which has made many countries envious. Moreover, China's chip research and development has once become a leader in the industry, not only replacing foreign technology in the past but also enabling Chinese brands to gradually go global. This great success marks the indomitable spirit of innovation and patriotism of Chinese scientific and technological researchers under pressure. Teachers can allow students to express their opinions when playing related content, and integrate ideological and political education from the perspective of independence, perseverance, and exploratory spirit, enabling students to establish positive life values and national pride^[20].

5. Conclusion

In summary, college students are the successors of the future technological development of our country. Teachers should continuously integrate ideological and political education into college physics teaching, attach importance to the moral level and life values of talents, and use intelligent teaching to let students understand the important significance of physics in human development and national progress, fully activate their spirit of exploration and innovation, lead the teaching results of college physics with high quality, character, and efficiency, and cultivate more outstanding talents for the development of science and technology in our country.

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