

Research and practice of ideological and political teaching in college physics course

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Abstract: Curriculum ideological and political education advocates integrating ideological and political education into all kinds of curriculum teaching, making ideological and political education go hand in hand with all kinds of curriculum teaching, building a collaborative education model, so as to improve students' moral sentiment. College physics teachers should actively promote the ideological and political construction of curriculum, excavate the ideological and political elements contained in textbooks, carry forward the advanced deeds of Chinese physicists, and cultivate students' patriotic feelings; Integrate the craftsman spirit into the physics experiment teaching, and cultivate students' craftsman spirit of excellence, preciseness and earnestness, and innovation; Carefully design ideological and political teaching cases, enrich teaching resource base, and cultivate students' scientific spirit of seeking truth from facts and perseverance; Use the mixed teaching platform to infiltrate ideological and political education, promote the connection between teaching inside and outside class, cultivate students' good study habits, and further improve the quality of college physics teaching.

Key words: college physics; Curriculum thought and politics; Necessity; Practice path

I. The necessity of ideological and political construction of college physics curriculum

1. It is conducive to cultivating students' patriotic feelings

College physics covers the knowledge points of rigid body mechanics, heat, electromagnetism, wave optics, and the basis of quantum mechanics. The textbooks introduce China's great achievements in the field of physics research, which can not only deepen students' understanding of cosmic phenomena and the laws of material changes, but also enhance students' national pride and cultural confidence. Inspire them to inherit the noble patriotic spirit of physical scientists who break the western technological blockade and dedicate their lives to the scientific research of the motherland. At the same time, the ideological and political course is conducive to enhancing the students' sense of social responsibility, encouraging them to actively participate in scientific research, so that they can learn professional knowledge well and contribute to the development of scientific research of the motherland.

2. It helps to shape the "three views" of students' health.

The ideological and political construction of college physics course is conducive to shaping students' correct outlook on life, values and world outlook, urging teachers to explain deeply the physicists' spirit of perseverance and not seeking fame and gain, setting a good example for students, further improving their moral sentiments, and exerting the educational value of physics course. College physics teachers can explain physicists' scientific research stories, let students know that the road of scientific research is not plain sailing, cultivate their perseverance, selfless dedication and lofty patriotic spirit, further encourage them to participate in physics competitions and scientific research projects, let them accept ideological and political education baptism in practice, and shape their health "three views".

3. It is conducive to improving students' practical ability

Physics teachers can extend ideological and political education to experimental teaching, so that students can accept the craftsman spirit and scientific research spirit in the process of experimental operation, further deepen their understanding of physics knowledge, cultivate their meticulous, rigorous and serious observation ability, and encourage them to conduct group experiments, so as to improve their practical ability. In addition, the ideological and political education of the course is also conducive to cultivating students' innovative and practical ability, allowing students to independently improve experimental schemes and experience virtual simulation experiments, so as to improve their scientific inquiry ability and problem-solving ability.

II. The current situation of college physics teaching under the background of curriculum ideology and politics

1. Teachers do not dig deeply into ideological and political elements of textbooks

With the further deepening of ideological and political construction of the curriculum, more and more college physics teachers begin to penetrate ideological and political education. However, some teachers do not fully and deeply explore the ideological and political elements of the textbooks, and only explain the life stories and achievements of physicists, without in-depth explanation of the arduous scientific research process and lofty scientific research spirit of physicists. In physics experiment teaching, some teachers only standardize the experimental operation steps of students, ignoring the infiltration of ideological and political education, which affects the integration of ideological and political education and physics teaching.

2. Ideological and political education penetrates through a single channel

Some college physics teachers attach more importance to theory and less to practice in ideological and political education. They neglect to extend ideological and political education to experiment teaching, physics homework and teaching evaluation, which affects the progress of ideological and political construction of college physics courses. Due to the single path of ideological and political construction of

college physics courses, it is difficult to interpret the feelings of home and country, the spirit of scientific research and the spirit of craftsman contained in physics textbooks, and it is difficult to give full play to the value of ideological and political education of physics.

3. It neglects to use information technology to infiltrate ideological and political education

Although college physics teachers are actively carrying out information-based teaching, they ignore the use of information technology to promote curriculum ideological and political construction, it is difficult to integrate the frontier scientific research results of extracurricular physics into teaching, and it is difficult to extend ideological and political education to extracurricular guidance and cooperation, which affects the quality of college physics ideological and political education. During the online teaching process, some teachers are busy explaining the knowledge points of the textbooks and the principles of physics experiments, passing over the knowledge points of the textbooks, neglecting to discuss with students the process and spirit of physicists' scientific research, and also neglecting to use the online teaching platform to carry out extracurricular guidance, which is not conducive to cultivating students' good learning habits.

III. Practice path of ideological and political teaching of college physics courses in the new era

1. Integrate the deeds of Chinese physicists and cultivate students' patriotic feelings

College physics teachers should actively infiltrate patriotic education, lead students to explore China's great achievements in the field of physics, and enhance their national pride and cultural confidence. For example, when teachers understand mechanics related knowledge, they can understand the story of academician Qian Weichang, "the father of modern mechanics" in China, and introduce his lofty patriotic spirit of resolutely asking to change his physics major, which he is not good at, and determined to study for the country. Academician Qian Weichang began to study physics from scratch and made extraordinary efforts. After graduation, he was admitted to the Research Institute of Tsinghua University and studied in the United States and Canada successively. After completing his studies, he gave up the generous treatment abroad and returned to China. He created the research direction of theoretical mechanics and nonlinear mechanics in China, made outstanding contributions to the development of China's aerospace, machinery manufacturing and civil architecture, and practiced his oath of learning for the country and learning for the country. At the same time, the faculty can collect academic papers published by Academician Qian Weichang in academic journals at home and abroad, lead the students to analyze his academic thoughts and physical achievements, and let them feel Academician Qian's scientific spirit of assiduously studying and bravely climbing mountains, as well as his passionate patriotic feelings, and encourage the students to inherit this patriotic spirit. College physics teachers should actively promote the ideological and political construction of the curriculum, dig out the advanced deeds of Chinese physicists related to the textbooks, such as learning the differential equation of rocket motion, explaining the story of Qian Xuesen, "the father of China's missiles" and "the father of China's rockets"; When learning nuclear physics, they should explain the stories of Qian Sanqiang and He Zehui, "China's Curie couple", so as to continuously penetrate patriotic education and enhance students' patriotic enthusiasm and national pride.

2. Integrate the craftsman spirit into physics experiment teaching to improve students' practical ability

College physics teachers should integrate ideological and political education into experimental teaching, infiltrate the spirit of craftsmanship, cultivate students' learning attitude of excellence, meticulousness and rigor, improve their moral quality, and promote the deep integration of physics teaching and ideological and political education. For example, teachers can integrate the craftsman spirit into the experimental teaching of the photoelectric effect measurement of Planck's constant, focus on teaching the experimental principles and methods of measuring Planck's constant, standardize the experimental operation steps of students, guide them to use Einstein's photon theory and the photoelectric effect equation and other inference experimental conclusions to improve their experimental operation ability. First, teachers can integrate the craftsman spirit into the experimental scheme design, standardize students' experimental equipment inspection, calibration and operation steps, enhance their safety awareness, and let them develop rigorous, responsible and meticulous experiment habits. Second, teachers should actively organize group experiments, give guidance on experimental Tours, promptly point out their problems in experimental operation, remind them to control experimental data errors, and cultivate their habits of thinking, rigorous and realistic, meticulous and excellence in experimental operation, so as to further enhance their craftsman spirit. For example, students should control the accuracy of experimental data in the process of experiment, observe the experimental error of the cutoff voltage corresponding to different frequencies, improve the accuracy of experimental data, and develop good habits of experimental operation. College physics teachers should integrate the craftsman spirit into experimental teaching, standardize students' experimental operation steps, urge them to control experimental data errors, and cultivate their physics learning attitude of excellence, innovation and meticulousness, so as to improve their physics experiment operation ability.

3. Carefully design the ideological and political cases of the course, and improve the physics teaching resource base

College physics teachers should actively excavate ideological and political elements in textbooks, design teaching cases, experiment plans and physics homework that combine physics and ideological and political education, build ideological and political education resource base, and further promote the ideological and political construction of college physics courses. First of all, teachers should conduct a comprehensive analysis of the textbooks, extract the ideological and political elements contained in each unit, and integrate them with the key and difficult points of unit teaching and ideological and political elements, so as to make the complex and abstract physics knowledge more intuitive and interesting, and stimulate students' interest in physics learning. For example, when explaining the related knowledge of quantum mechanics, teachers can integrate the scientific research spirit of physicists in the field of quantum mechanics, which is perseverance, pursuit of truth, preciseness and meticulousness, so that students can feel the hard-won scientific research results, encourage them to learn the scientific research spirit of physicists, and improve their scientific inquiry ability. Secondly, teachers can record

videos to more intuitively present the close connection between physics and ideological and political education, create interesting teaching situations, so that students can be imperceptibly influenced by ideological and political education and improve their moral quality. For example, teachers can record electromagnetics experiment operation videos to show each experiment operation step in detail, and add mind maps to micro-lessons to refine the key points of experiment operation, so as to help students memorize the experiment steps and improve their experimental operation ability. In addition, the micro-class can also list the physicist's experiment plan, guide students to conduct extracurricular exploration, enrich their physical knowledge reserve, cultivate their good learning habits, and further promote the ideological and political construction of college physics courses.

4. Blended teaching permeates ideological and political education to improve students' learning ability

College physics teachers should integrate ideological and political education into after-class guidance, use the mixed teaching platform to infiltrate ideological and political education, cultivate students' good study habits, so as to improve their physics learning ability. For example, when teachers explain the angular momentum of fixed axis rotation of rigid bodies, the angular momentum theorem, and the law of conservation of angular momentum, they can upload the demonstration video of Chinese astronaut Ye Guangfu's rotation in space on the COOC teaching platform of our college, showing the relationship between the moment of inertia of the arm and the rotational speed, so that students can understand China's aerospace achievements and stimulate their learning interest. In the offline teaching process, physics teachers should actively interact with students, guide them to analyze the angular momentum of rigid body fixed axis rotation and the related formulas of the conservation of angular momentum, and encourage them to collect relevant cases in life, stimulate their enthusiasm to speak, and further improve their independent learning ability. At the same time, teachers can design online tests to test students' learning effects, use big data to analyze students' mistakes, provide accurate data for offline teaching, carry out targeted teaching, facilitate students' independent review, and cultivate their good learning habits. Teachers should urge students to make full use of after-school time, encourage them to explore extracurricular knowledge, cultivate their good learning habits of thinking diligently, summarizing well and cooperating in exploration, and give full play to the value of college physics ideological and political education.

IV. Conclusion

In a word, college physics teachers should actively promote the ideological and political curriculum, dig deep into the ideological and political elements contained in the textbooks, carefully design the ideological and political curriculum cases, connect the ideological and political education with physics knowledge points, enhance the interest of physics teaching, stimulate students' interest in learning, cleverly integrate the achievements of Chinese physicists, and enhance students' patriotic enthusiasm and national pride. At the same time, teachers can also integrate the spirit of craftsman into the experimental teaching, standardize the operation steps of students, cultivate their craftsman spirit of excellence, innovation and innovation, use the mixed teaching mode to infiltrate ideological and political education, cultivate students' good study habits, and comprehensively improve the quality of ideological and political construction of college physics courses.

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Foundation Project: University-level Research Project (LQ-ZD-202303)

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