



The Practice of Integrating Curriculum Ideology and Politics into University Physics Course Teaching Organically

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Abstract: In the process of cultivating high-quality applied talents in contemporary colleges and universities, any teacher should integrate curriculum ideology and politics into daily curriculum teaching. This is a task that every teacher must undertake. It is an inevitable requirement for the cultivation of high-quality talents with Chinese characteristics and socialism. It is an inevitable requirement for the cultivation of high-quality talents that meet the (outcome-based education) OBE concept and the needs of the country. Through years of organic integration of the ideological and political content of the curriculum into the teaching practice of college physics, the author has realized that this can not only achieve better teaching results, but also comprehensively improve the teachers' own education and teaching level. The author would like to take this opportunity to share some personal experiences with colleagues.

Keywords: curriculum ideology and politics, organic integration, OBE concept, talent training mode

1. Introduction

Curriculum ideology and politics is a comprehensive education and teaching concept and specific implementation methods. It uses a curriculum education and teaching form of constructing a full-staff, full-process, full-course education, that is, "three-full education" pattern, which forms a co-curricular and synergistic education with various courses and the ideological and political theory courses offered by various schools. model. It regards "cultivating morality and cultivating people, teaching and educating people" as the fundamental task of higher education. ^[1] "Curriculum ideology and politics" is different from "ideological and political curriculum". It asks every teacher to integrate the elements and contents of "curriculum ideology and politics" into the curriculum teaching under the guidance of the entire talent cultivation plan and teaching system. This kind of integration does not have any compulsiveness, but it is an indispensable element and content in the high-quality talent training program that China's higher education country urgently needs ^[2]. However, for most young teachers, there is still a big difference among the understanding of what is "curriculum ideology and politics", how to carry out curriculum ideology and politics teaching, and how to integrate "curriculum ideology and politics" elements into the process of curriculum teaching. At the same time, there are deficiencies in experience in the acquisition and understanding of the "element and content" of curriculum ideology and politics, and the effectiveness of the organic combination with the teaching content of the curriculum. It is very meaningful for everyone to jointly improve the teaching level of curriculum ideology and politics through mutual exchanges and mutual learning.

2. How to integrate "curriculum ideology and politics" into the course teaching process

2.1 Understand the importance and significance of "curriculum ideology and politics" elements in curriculum teaching

"Curriculum ideology and politics" is a teaching content that has a positive impact on the students' outlook on life, science, values, and world, that is, the "Four Outlook" included in the teaching of the curriculum. The outlook on science must be added here, because it has the scientific cognition attributes of higher education and talent training. The teaching content of "curriculum ideology and politics" is not isolated from the normal course teaching but "mechanically applied" content. It is an important part of the teaching system and curriculum teaching content of the entire college student talent training program, and it can be organically integrated into the whole process of curriculum teaching. It requires teachers to promote it to a higher teaching height [3,4]. The characteristics of "curriculum ideology and politics" are: the content is fresh, forward-looking, scientific, and instructive. It has an important leading role in the formation of the Four Outlooks of college students, and it is even for college students to leave the school to engage in scientific research and technological development. Engaging in the work of government departments has important guiding significance.

2.2 Deeply understand the connotation of "curriculum ideology and politics" and improve the quality of selection of teaching content of "curriculum ideology and politics"

Only when teachers have a deep understanding of the connotation of "curriculum ideology and politics" can they integrate the curriculum ideology and politics content accurately, scientifically, and deeply in the course of teaching. For example, when talking about mechanical vibration and fluctuation, the technical innovations contained in China's high-speed rail's core technologies with independent intellectual property rights — "high-speed rail shock absorbers", "seamless steel rails", etc., are in place to truly stimulate the learning interest of the majority of students. The explanation of the modern application of the basic knowledge learned will be more thorough and clear. Students will have a correct understanding of the great achievements of our country's independent and technological innovation. It can be seen that the teacher's knowledge, grasp and selection of the ideological and political content of the course require the teacher to have a deep understanding of the selected content, and be able to integrate these "live" curriculum ideological and political content into the teaching of the course content. For teachers, this is also a double improvement of awareness and knowledge. If the examples selected by the teacher are not accurate or even correct, it will have a negative effect of "misleading students". Therefore, the teacher must carefully prepare the relevant teaching content to ensure the quality of teaching ^[4].

2.3 How to organically integrate the content of "curriculum ideology and politics" and the content of curriculum education

This problem should be a practical problem that many teachers are confused or have differences in understanding. Judging from the practical experience of education and teaching in different types of colleges and universities for many years, several combinations should be realized. (1) The latest advances in world science and technology, especially the latest advances in Chinese engineering and technology, can be combined with the knowledge of university basic physics. For example, China's large-scale scientific project—the combination of the world's largest diameter radio telescope and the resolution knowledge and concepts in the diffraction of light; the road and bridge engineering and the high-speed railway bridges and bridge railways in China's western high-speed railway bridges and bridge railways. Combine and so on. (2) The "Four Outlooks" in the content of these "Curriculum Ideological and Political" should be combined with the development goals and objectives of the taught knowledge used in engineering technology. For example, the combination of China's lunar exploration project and Mars exploration and how to use the relevant kinematics, dynamics and other knowledge we have learned to achieve this grand goal, and so on. (3) As a teacher, you should pay attention to the scientific and technological progress related to the course teaching content in time, not only to be "learned", but also to be able to attract students, arouse students' resonance and attention, and achieve the goal of "curriculum ideological and political" deeply rooted in the hearts of the people. Teachers should guide students to take the initiative to relate to current affairs, to care about the latest application of the professional knowledge they have learned, and to relate to the latest developments in science and technology.

2.4 How to test the effectiveness of teachers' teaching and students' learning

The author believes that the test of the teaching effect of the curriculum ideological and political curriculum can be judged from the following aspects. (1) Some questionnaires can be designed to conduct questionnaire surveys, so that the first-hand and most authentic students' evaluation of the effect of integrating curriculum ideology and politics into classroom teaching can be obtained. The design of the questionnaire requires careful preparation. (2) The ideological and political teaching content of the course is fully prepared, including videos, pictures, clear physics principles, the effects of the application of physics principles, and innovative curriculum concepts that attract students. At the same time, it should be very popular with students, can effectively attract students' attention, and melt into their study and thinking. (3) The ideological and political content of the curriculum must first enter the talent training program, enter the curriculum outline, enter the teaching plan, enter the teacher's brain. (4) Students can have the correct "Four Outlooks" through learning, and be able to link the curriculum ideology and politics with the content of the curriculum.

3. A practical case of the integration of curriculum ideology and politics with college physics teaching content

Due to space limitations, this article gives the ideological and political outline of the 24-hour course content of the second semester of college physics, which is for reference only.

Table 1. The syllabus for the second semester of college physics (including curriculum ideology and politics)

Course content of the second semester					
No.	Teaching content	Student's expected learning outcomes	In-class hours	Curriculum ideology and politics	Supporting curriculum goals
1	V. Mechanical vibration Dynamic characteristics of simple harmonic vibration, kinematics of simple harmonic vibration, energy of simple harmonic vibration, synthesis of simple harmonic vibration, damped vibration, forced vibration, resonance Key points and difficulties of teaching: The description of simple harmonic vibration, the rotation vector method to solve the phase.	Understand and master the description characteristics and research methods of simple harmonic motion, highlight the physical meaning of phase and phase difference, especially learn the rotation vector method to solve the phase.	4	Case: Vibration reduction in mechanical vibration and the core technology of China's high-speed railway-vibration reduction system design and disaster reduction.	Goal 1
2	VI. Mechanical waves Formation and propagation of mechanical waves, wave function of simple harmonic vibration, wave energy, Huygens principle, superposition and interference of waves, standing wave, Doppler effect Key points and difficulties of teaching: The concept of phase propagation in wave propagation and the role of phase difference in wave superposition.	Understand and grasp the concept of phase propagation in wave propagation and the role of phase difference in wave superposition. Students are required to further master the principle of linear motion superposition, and to understand the characteristics of nonlinear problems through the analysis of the chaotic phenomenon of the damping pendulum under the action of periodic external forces. Cultivate students to establish a scientific world view and master the scientific methods of analyzing and solving problems	4	Case: Wave energy and earthquakes and their prevention.	Goal 1 and Goal 3
3	X. Interference of light Basic laws of geometric optics, paraxial imaging of curved surfaces, optical coherence, Young's double-slit interference experiment, optical path and optical path difference, thin film interference, wedge interference, Newton's ring, Michelson interferometer Key points and difficulties of teaching: Basic principles and related calculations such as Young's double-slit interference experiment, optical path and optical path difference, film interference, wedge interference, etc.	Understand and master the physical knowledge of geometric optics, the laws of optical interference, optical path, etc., and be able to apply the corresponding knowledge of interference to solve practical problems, such as the calculation of film thickness, the judgment of anti-reflection and anti-reflection, etc.	6	Case: The physical essence of interference and the latest development of quantum communication research in China. China's internationally leading scientific spirit in the field of quantum communication.	Goal 1
4	XI. Diffraction of light Light diffraction pattern Huygens-Fresnel-like principle, single-slit Fraunhofer diffraction, diffraction grating, circular aperture diffraction, resolving power of optical instruments, X-ray diffraction Case study: Optical problems in "China Sky Eye" FAST. Understand the important tools of the great power and increase the national pride of the students. Key points and difficulties of teaching: Single-slit Fraunhofer diffraction, diffraction grating, circular aperture diffraction, resolving power of optical instruments.	Understand and grasp the respective characteristics of single-slit diffraction, grating diffraction and circular aperture diffraction, and be able to apply diffraction knowledge to analyze, judge, interpret and calculate some physical problems related to preliminary diffraction phenomena. Able to express complex engineering problems in engineering based on the knowledge of light diffraction, analyze and judge the scientificity and rationality of the scheme.	6	Lecture/Case: Analyze the optical problems in the "Chinese Sky Eye" FAST. Learn about our country's major scientific projects and increase students' national pride.	Goal 1 and Goal 2
5	XII. Polarization of light Natural light and polarized light, polarization, analyzer, Marius' law, polarization of light caused by reflection, polarization of light scattering, birefringence of light Key points and difficulties of teaching: Marius' law, the polarization of light caused by reflection.	Understand and master the physics related to the polarization of light, and apply Marius' law to solve some physical problems.	4	Case: Polarization physics phenomena and related latest international physics cutting-edge research results.	Goal 1

4. Experience

The organic integration of the ideological and political elements of the curriculum in the normal subject teaching process is not only the need for the country's high-quality talent training, but also the need for moral cultivation, teaching and educating people. To do a good job in curriculum ideological and political teaching, teachers must have a higher level

of understanding and the ability to control curriculum ideological and political teaching, and organically integrate it with normal curriculum teaching. This is the responsibility and obligation of every teacher. Only in this way can we truly realize the national strategic goal of establishing morality and cultivating people.

Acknowledgments

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