

Strategies for Cultivating Students' Core Quality of Physics in Senior High School by Using Micro-class

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Abstract: The new curriculum standard puts forward the training requirements for the core quality of physics teaching in senior high school. Teachers are good at developing and utilizing micro-classes, which can not only create intelligent physics classes, but also improve the quality and efficiency of the development of students' core quality of physics. Therefore, teachers should deepen the necessity of using micro-class to cultivate students' core physical literacy in senior high school, drill Internet digital teaching resources according to the physical teaching process and core literacy dimensions, carefully design teaching micro-courseware, highlight the key and difficult points of physics courses, guide students to carry out effective physical exploration activities, and thus achieve the goal of cultivating core physical literacy through micro-class. Based on this, this article studies the strategies of using micro-class to cultivate students' core quality of high school physics for reference.

Keywords: Micro-class; High school physics; Core quality; Training strategy

Introduction

Traditional teaching concepts and teaching methods can not meet the requirements of high school teaching reform. To improve the teaching height and enrich the teaching content are the problems that high school physics teachers should focus on. Under the talent cultivation strategy of our country, it is very necessary to focus on developing students' core literacy. High school physics teachers should integrate the national education requirements and school teaching requirements to customize the teaching plan for students, and be ready to cultivate their physical concepts, physical thinking, and sublimate their physical subject emotion. In the process of continuous promotion of teaching reform, high school physics teaching objectives also tend to be diversified. Only by cultivating senior high school students' basic physics concepts, good scientific thinking and correct scientific attitude can we meet the basic requirements of core literacy for senior high school physics teaching. In this paper, from the perspective of core literacy, the specific situation of the current high school physics core literacy training is discussed in detail, and several teaching suggestions are put forward for reference.

1. Overview of micro-class

Micro lesson is a kind of micro online teaching video, the time is generally controlled within 10 minutes, but the theme is prominent, targeted, and can clearly and accurately explain a knowledge point or a problem, which is easy to teach and spread. In the field of education, micro lesson can be seen as a teaching resource, and also as a teaching tool. Applying it to subject teaching can not only improve the artistry of subject teaching, but also mobilize students' good mood, Let students have a strong interest in participation and actively participate in classroom learning. Based on the concept of micro-class and relevant application experience, it can be seen that micro-class has many characteristics, which are embodied as follows: first, time refining. Time refining is both the basic feature of micro-class and its advantage. Presenting micro-class frequency in limited class time will not only take up a lot of time, but also use a very short time to explain knowledge points or problems in detail, so that students can accurately understand physical knowledge or understand physical problems, Get good learning results. Second, focus on explanation. The micro-class video is designed and produced for a key or difficult point, and can explain the key or difficult knowledge in detail. Students can solve the learning confusion by carefully watching the micro-class video

content, truly understand the key or difficult knowledge, and reach the state of integration and penetration. Third, vivid image. In order to truly fit the interests of students, the micro-class video produced is usually 3D or other image animation or video to present theoretical and abstract physical knowledge, which makes the micro-class content vivid and interesting, can attract students' eyes, mobilize students' good mood, let students focus on watching the micro-class, intuitively learn knowledge, and more easily understand and master physical knowledge.

2. Problems in physics teaching in senior high school

First, theory is more important than practice. At the present stage, physics education pays attention to the cultivation of students' physical thinking, but in the actual process of physics classroom teaching, there is still a teacher-centered explanation and instillation teaching. For the sake of learning efficiency, teachers prefer students to grasp the concept of physical knowledge and different application forms faster. Therefore, compared with heuristic teaching, teachers prefer to tell students the physical conclusions directly and clearly. More attention is paid to the application of physics conclusions in senior high school physics topics, and less attention is paid to the derivation and verification of physics formulas and abstract concepts, which leads to students' "knowing it but not knowing its reason", and the learning of physics knowledge only stays in the superficial memory and problem making application, while teachers neglect to guide the improvement of students' comprehensive physical ability and physical application ability in real life. Second, physics teaching content is fragmented. In the current physics teaching process, the presentation of the knowledge points of each module is closer to fragmentation, and the correlation between the knowledge points is not strong. In the examination of physics, the questions are often very comprehensive, and often involve multiple knowledge points in the same subject. Students need to fully understand the relevant physical knowledge and be able to use it flexibly to effectively solve physical problems. Take the simulated college entrance examination questions of mechanics as an example: "There is a flat car with a mass of $M=4.0\text{kg}$ on the smooth horizontal plane. The upper surface of the car is a rough horizontal track with a length of $l=1.5\text{m}$. The left side of the horizontal track is connected with a $1/4$ smooth arc track with a radius of $r=0.25\text{m}$. The arc track is tangent to the horizontal track at point O. Now, a small object with a mass of $m=1.0\text{kg}$ is slid onto the flat car from the right end of the flat car at the initial speed v_0 from the horizontal to the left. The dynamic friction coefficient between the small object and the horizontal track is 0.5 , and the small object can just reach the highest point a of the arc track, and calculate the initial speed v_0 of the small object sliding onto the flat car. " This topic is a relatively obvious mechanical problem of pseudo-collision, and there is a friction before the pseudo-collision. Therefore, when solving the problem, we should pay attention to the word "just", first momentum analysis, then energy analysis, and use the comprehensive knowledge of mechanics to solve the problem. Therefore, in the actual teaching process, teachers should combine the physical examination method to build a systematic physics teaching model that allows students to fully associate.

3. Strategies for cultivating students' core quality of physics in senior high school by using micro-class

3.1 Utilize micro-class to implement physics STSE expansion and cultivate students' scientific attitude and responsibility

High school physics belongs to an STSE discipline, that is, physics research is closely related to science, technology, society and environment. Scientific attitude and responsibility play an important role in the core quality of physics. If teachers want to improve this quality of students, they should strengthen the use of Internet digital resources to prepare micro-class, implement the physics STSE expansion teaching, guide students to understand the application examples of physical knowledge in the fields of scientific and technological development, social production and life, environmental protection, etc., so as to enrich the capacity of physics teaching and cultivate students' scientific attitude and responsibility. The relevant teaching strategies are as follows: After teaching the basic knowledge of physics concepts, formulas, theorems, etc., teachers should collect the physical STSE expansion data on the Internet platform according to the specific knowledge points, and integrate them into micro-courseware. After showing students the physics STSE development micro-courseware, teachers also need to lead students to carry out detailed discussion on the content of the courseware. If the teacher uses the micro-class to present a news material about the application of physics to control the environment, he can ask the following questions: students, what is the environmental pollution problem reflected in the news? What hazards may occur if the treatment is not timely? What is the role of physics knowledge and skills you have mastered? The students will immediately participate in the interactive discussion based on the micro-class data. At this time, the teacher should follow up and guide the students to connect with the reality

of life, analyze the current situation and hazards of environmental pollution in the STSE case, encourage students to think and communicate cooperatively, explain the principles of environmental governance by using physical concepts, and make students realize that the study of physics determines the sustainable development of the natural environment and human civilization, So as to effectively use micro-class to cultivate students' good mood of caring for society and environment.

3.2 Increased teachers' attention to student development

In the process of construction and application of micro-class, teachers deeply consider students' knowledge structure and cognitive level, and take measures such as teaching optimization, experimental improvement, micro-class demonstration to help students make up for cognitive defects and stimulate students' learning enthusiasm and thirst for knowledge.

3.3 Developing micro-class from the perspective of meeting the needs of physics teaching

Physical micro-class should not be limited to a fixed format. Teachers should combine the characteristics of physical curriculum and teaching needs to develop targeted. For example, for the same topic, the team prepares different teaching resources for new lectures, exercise classes and review classes to help students improve their cognitive structure.

4. Conclusion

The micro-class is systematic, progressive and expansive, breaks the shackles of the traditional classroom, opens up a way for students to learn selectively and independently, and is an important form of deep integration of information technology and classroom teaching. Micro-class construction is an important part of digital teaching and curriculum reform. Teachers should actively develop and apply digital teaching resources, promote the construction of curriculum resources and curriculum reform, and achieve a virtuous circle and coordinated development.

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