

Research on College Physics Classroom Teaching Based on STSE Concept

Guofang Du, Yan Cai*

School of Physics and Information Engineering, Zhaotong University, Zhaotong, Yunnan, China

**Corresponding author*

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Abstract: The purpose of this paper is to discuss the research of college physics classroom teaching based on the concept of science and technology social environment (STSE). Through the discussion of STSE concept, we found that linking classroom teaching with social reality can improve students' learning interest and learning effect. In teaching, teachers can guide students to explore the impact of science and technology development on society, so as to enhance students' scientific literacy and sense of social responsibility. At the same time, we also need to pay attention to the depth and breadth of teaching content, as well as the diversity and flexibility of teaching methods to meet the different learning needs of students. The research of college physics teaching based on STSE concept will help to cultivate students' comprehensive quality and innovative ability, and promote the effective teaching of college physics.

1. Introduction

With the advent of the information age, the development of education has entered a new stage. The traditional education model has been unable to meet the needs of modern education. Therefore, exploring a new education model has become an important issue in today's education field. In this case, the STSE concept came into being. The STSE concept is a model of science and technology society and environmental education. It focuses on the interaction between science and technology and the social environment, emphasizing that the development of science and technology is affected by social, economic, political and other factors, and has a profound impact on the social environment. The core of the STSE concept is problem-oriented learning, emphasizing that students should master the knowledge and skills of science and technology through independent exploration and cooperation and sharing, and pay attention to the relationship between science and technology and social environment. In college physics classroom teaching, STSE concept has also been gradually applied. Traditional physics education overemphasizes the teaching of theoretical knowledge and ignores the connection between physical knowledge and real life, which is not conducive to students' in-depth understanding of physics. The teaching mode based on the STSE concept can help students better understand the nature of scientific knowledge, enhance their exploration spirit and innovation ability, and improve their understanding of the relationship between science and technology and social environment^[1,2].

Therefore, the research of college physics classroom teaching based on the STSE concept will be discussed, aiming at exploring a new teaching mode, helping students better understand the nature of physics knowledge, improving students' learning interest and learning effect, and strengthening students' understanding of the relationship between science and technology and social environment, so as to lay a solid foundation for students' future scientific research and social life.

2. STSE Concept and its Application in Physics Education

The STSE concept refers to a comprehensive system of interaction between science, technology, society and environment. It emphasizes that science is not only a knowledge system, but also an inseparable relationship with society and environment. In physics education, STSE concept can be applied to the selection of teaching content and the reform of teaching methods. Teachers can select physical problems related to society and environment, such as energy, pollution, climate change, etc., to let students understand that physical knowledge plays an important role in solving social problems. At the same time, the traditional physics teaching focuses on the teaching of theoretical knowledge, while the STSE concept emphasizes the participation and practice of students. Therefore, teachers can use inquiry learning, case analysis, research learning and other methods to let students experience and explore the role of physics knowledge in practical application^[3].

The concept of STSE also plays an important role in the way of student evaluation and the connection between curriculum and society. Traditional examination evaluation only focuses on students' mastery of theoretical knowledge, while STSE concept emphasizes students' practical ability and sense of social responsibility. Therefore, a variety of evaluation methods can be adopted, such as project evaluation, oral report, writing, presentation, etc., so that students can show their learning achievements and sense of social responsibility in practice. In addition, the STSE concept believes that science education should be closely linked to social and environmental issues, so the curriculum should be updated regularly to adapt to social and environmental changes. Teachers can guide students to pay attention to news, scientific and technological progress and environmental problems, and make them realize the important role of physics knowledge in solving social problems^[4].

In short, the application of STSE concept in physics education can help students better understand the relationship between science and society and environment, cultivate students' practical ability and sense of social responsibility, and improve students' learning interest and scientific literacy.

3. College Physics Classroom Teaching Method Based on STSE Concept

To teach college physics based on the concept of STSE, the teaching method should focus on students' participation and practice to cultivate students' practical ability and sense of social responsibility. The specific teaching methods include inquiry learning, inquiry learning, case analysis, project-based learning and student report. Inquiry learning enables students to explore physics knowledge independently through experiments, observation and measurement, and improves students' practical ability and problem-solving ability. Research-based learning enables students to study the application of physics knowledge in solving problems from the perspective of social and environmental problems, so that students can have a deeper understanding of the relationship between physics knowledge and society and environment^[5]. Case analysis selects cases related to society and environment to let students analyze the nature and solutions of problems, and cultivate students' analytical thinking and innovation ability. Project-based learning allows students to participate in projects related to society and environment, such as energy, environmental protection, scientific and technological innovation, so that students can experience the application

of physics knowledge in practice and improve their practical ability and sense of social responsibility. Finally, the student report encourages students to share their research results and thinking in class, so that students can improve their ability of expression and critical thinking in communication^[6].

The above teaching methods can be combined to help students master physics knowledge in practice and improve their practical ability and sense of social responsibility. At the same time, teachers can guide students to pay attention to social and environmental problems, let students realize the important role of physics knowledge in solving social and environmental problems, and improve students' scientific literacy and sense of social responsibility.

4. College Physics Classroom Teaching Effect Based on STSE Concept

The effect of college physics classroom teaching based on STSE concept is mainly shown in the following aspects. First of all, students' practical ability has been improved. Through inquiry learning, research learning and project-based learning, students have more practical opportunities and master more practical skills, thus improving their practical ability. Secondly, students' sense of social responsibility has been strengthened. By paying attention to social and environmental problems, students have realized the important role of physics knowledge in solving social and environmental problems, thus improving their sense of social responsibility and innovation spirit. Third, students' critical thinking ability has been improved. Through case analysis, student reports and other ways, students not only master physics knowledge, but also learn the methods of analyzing and solving problems, and improve their critical thinking ability and innovation ability. Fourth, students have a more comprehensive understanding of physics knowledge^[7]. By connecting physics knowledge with society and environment, students can have a deeper understanding of the application of physics knowledge, so as to have a more comprehensive understanding of physics knowledge. Finally, students' interest in learning is stimulated. Through inquiry learning, research learning, project-based learning and other ways, they can experience the application of physics knowledge in practice, so as to stimulate students' interest in learning and let students participate in the classroom more actively^[8].

The effect of college physics classroom teaching based on the STSE concept is very significant. It not only improves students' academic level, but also cultivates students' practical ability, sense of social responsibility, critical thinking ability and innovative spirit, making students more competitive in their future work and life^[9].

5. Problems and Countermeasures of College Physics Classroom Teaching Mode Based on STSE Concept

5.1. Problems of College Physics Classroom Teaching Mode Based on STSE Concept

The college physics classroom teaching mode based on the STSE concept faces some problems. First of all, the teaching method of improving practical ability needs more laboratory equipment and resources, which is very difficult for some schools with insufficient educational resources. Secondly, the improvement of students' sense of social responsibility requires teachers to pay attention to the education of social issues, but teachers may not have enough time and experience to explore these issues in depth. Third, the improvement of critical thinking requires students to participate in more case studies and student reports, but this requires more classroom time and teacher guidance. Fourth, linking physics knowledge with society and environment can help students understand the application of physics knowledge more deeply, but this requires teachers to have interdisciplinary knowledge. Finally, the stimulation of students' learning interests requires teachers to use different

teaching methods and teaching resources, but this requires teachers to constantly update teaching methods and improve teaching skills. To sum up, the college physics classroom teaching model based on the STSE concept needs to overcome some challenges, and teachers need to constantly explore and innovate^[10].

5.2. Countermeasures for College Physics Classroom Teaching Mode Based on STSE Concept

In order to overcome the problems faced by the college physics classroom teaching model based on the STSE concept, the following countermeasures can be taken. First, schools and educational institutions can provide more laboratory equipment and resources to support the improvement of practical ability. Secondly, schools and teachers can use social problems as teaching cases of physics knowledge to improve students' sense of social responsibility. Third, teachers can increase the proportion of case analysis and student reports to improve students' critical thinking ability. Fourth, teachers can cooperate across disciplines to link physical knowledge with society and environment to deepen students' understanding. Finally, teachers can use a variety of teaching methods and teaching resources to stimulate students' interest in learning. These countermeasures require the joint efforts of schools and teachers to constantly innovate teaching methods and improve teaching quality to promote the development and growth of students.

To sum up, there are some problems in the college physics classroom teaching mode based on the STSE concept, but as long as teachers continue to improve their teaching level, adopt a variety of teaching methods, and constantly adjust the teaching content and methods, they can effectively solve these problems and improve the teaching efficiency.

6. Conclusion

In the research of college physics classroom teaching based on STSE concept, we found that this teaching mode has many advantages, which can effectively improve students' learning interest and practical ability, and enable students to better understand and apply physics knowledge. At the same time, we also found some problems in practice, such as students' low interest in learning, teachers' lack of in-depth understanding and practical experience of the STSE concept, etc. In response to these problems, teachers can adopt a variety of teaching methods, such as interactive teaching, case teaching, experiment, etc., to guide students to participate in class discussions, group activities, etc., and improve students' participation and learning interest. At the same time, teachers also need to constantly study and study the STSE concept, improve their understanding and practical experience of the STSE concept, and constantly adjust the teaching content and methods to meet the actual needs and interests of students.

In the future, we hope to further study the college physics classroom teaching mode based on the STSE concept, explore more effective teaching methods and strategies, and improve students' learning effect and practical ability. At the same time, we also hope to apply the STSE concept to the teaching of other disciplines, further improve the education system, and provide more high-quality education for students.

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