

Research on the Ideological and Political Teaching Design of “Probability Theory and Mathematical Statistics” Course

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Abstract:

With the advancement of teaching reform, the role of curriculum ideological and political ideas in moral education is increasingly important. The course “Probability Theory and Mathematical Statistics” is a course that studies the statistical regularity of random phenomena. Teachers integrate the ideological and political concepts of the course into the teaching design process and add ideological and political elements into the course teaching, which can not only show the ideological and political value of the course “Probability Theory and Mathematical Statistics” but also improve students’ ideological and political literacy and promote the all-round comprehensive development of students. This paper will analyze and discuss three aspects of the “Probability Theory and Mathematical Statistics” course ideological and political teaching overview, “Probability Theory and Mathematical Statistics” course ideological and political teaching design principles and ideas, and “Probability Theory and Mathematical Statistics” course ideological and political teaching implementation strategy.

Keywords:

Probability theory and mathematical statistics
Curriculum ideological and political
Instructional design

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1. Introduction

In the National Conference on Ideological and Political Work of Colleges and Universities, the importance of curriculum ideology and politics is emphasized, which means that education should infiltrate curriculum

ideology and politics into the teaching of various professional courses, integrate curriculum knowledge teaching with ideological and political education, and enable students to find and solve problems with correct ideas and attitudes. The teaching of the course “Probability

Theory and Mathematical Statistics” pays more attention to the teaching of thinking methods and scientific spirit and realizes the ideological and political teaching of “Probability theory and mathematical statistics,” which helps students to improve their knowledgeability and spiritual quality. Especially in the context of the continuous development of The Times, the course “Probability Theory and Mathematical Statistics” has been widely used in society, such as medicine, geology, finance and other fields, which requires teachers to highlight the ideological and political education function of the course when carrying out the ideological and political teaching design of the course “Probability Theory and Mathematical Statistics.”

2. Overview of ideological and political teaching of “Probability Theory and Mathematical Statistics” course

2.1. Introduction of the course “Probability Theory and Mathematical Statistics”

The course “Probability Theory and Mathematical Statistics” is a compulsory course for statistics majors and other science and engineering majors in universities, and it is also a public mathematics course. The content of this course is mainly divided into probability and statistics. There are some differences in the teaching content, but the teaching structure is similar. Among them, the statistics part mainly analyzes and judges practical problems in data collection and analysis closely related to daily life. It can also be said that mathematical statistics are needed wherever there are numbers, which also shows the importance of teaching this course. In the “Probability Theory and Mathematical Statistics” course, teachers usually focus on explaining theoretical knowledge, supplemented by course application, and appropriately applying some software to teach course content^[1-3].

2.2. Curriculum ideological and political overview

As the main direction of modern college education reform, curriculum ideological and political education mainly refers to the behavior of colleges and universities to carry out ideological and political education in non-ideological and political courses, usually in professional

courses or open courses to carry out ideological and political elements, to achieve the purpose of ideological and political teaching. The ideological and political curriculum is mainly carried out with the ideological and political courses in colleges and universities. It penetrates the fundamental goal of moral cultivation into college education and teaching. Through the analysis of the connotation of curriculum ideology and politics, it can be seen that curriculum ideology and politics cannot be blindly instilled in the classroom but should be combined with the teaching content of professional courses according to the teaching objectives and characteristics of professional courses to carry out ideological and political teaching to improve students’ knowledge and ideological and political level in class. Therefore, if high-quality curriculum ideology and politics are required, teachers have to fully explore the ideological and political elements in the curriculum and naturally integrate ideological and political education into it to subtly influence students’ thoughts and behaviors. This requires teachers to find appropriate methods and means to combine curriculum content with ideological and political content in the course of ideological and political teaching design to achieve the purpose of curriculum ideological and political content^[4].

2.3. The advantages of ideological and political teaching of “Probability Theory and Mathematical Statistics” course

Because different courses have their characteristics and logic, the ideological and political teaching of “Probability Theory and Mathematical Statistics” is feasible mainly because the coupling between the course and the curriculum ideological and political construction of “Probability Theory and Mathematical Statistics” has significant advantages.

First of all, the course “Probability Theory and Mathematical Statistics” is rich in theoretical knowledge and pays more attention to the teaching and application of theoretical knowledge. A lot of theoretical knowledge contains mathematical history, mathematical thought, humanistic spirit and other contents. An in-depth exploration of theoretical knowledge and the integration of ideological and political teaching will help students form correct ideological concepts and spiritual qualities.

Secondly, as a compulsory course, “Probability Theory and Mathematical Statistics” has many students. Integrating ideological and political elements into “Probability Theory and Mathematical Statistics” can influence students’ ideological values and moral qualities and enable students to develop more comprehensively. Finally, the “Probability Theory and Mathematical Statistics” teachers have a solid grasp of theoretical knowledge and strong teaching ability, but their cognition of ideological and political teaching is fuzzy. Therefore, by promoting ideological and political teaching in the curriculum, colleges and universities can improve the ideological and political concepts of the course teachers and then integrate ideological and political elements into the course teaching ^[5-8].

3. “Probability Theory and Mathematical Statistics” course ideological and political teaching design principles and ideas

3.1. Principles

3.1.1. Scientific principles

The scientific principle means that in the process of completing the ideological and political teaching design of the course “Probability Theory and Mathematical Statistics,” teachers should combine the teaching reform and ideological and political teaching concepts, keep up with the needs and requirements of The Times and scientifically arrange and design the content and form of curriculum ideological and political teaching, rather than blindly copy the teaching experience of others. Instead, the teaching design should combine the course’s characteristics and the students’ situation.

3.1.2. Integration principle

The principle of integration means that in the ideological and political teaching design of the “Probability Theory and Mathematical Statistics” course, it is necessary to ensure the effective integration of curriculum teaching and ideological and political teaching, find out the key points of the integration of curriculum teaching and ideological and political teaching and adopt diversified teaching methods to achieve the effective integration and natural transfer of ideological and political teaching so that students’ ideological and political literacy can be

imperceptibly influenced and infected. Then, the correct and positive student mindset can be formed.

3.1.3. Principle of direction

The orientation principle means that when teachers carry out the ideological and political teaching design of “Probability Theory and Mathematical Statistics” course, they should clarify the direction and goal of ideological and political teaching of the course, integrate the teaching goal, ideological and political teaching goal and student development goal, and clarify the direction of ideological and political teaching of “Probability Theory and Mathematical Statistics” course to complete the teaching design.

3.2. Ideas

The idea of reverse teaching design is mainly proposed based on traditional teaching sequences. In the process of the ideological and political teaching design of the “Probability Theory and Mathematical Statistics” course, teachers should first explore the ideological and political elements in the textbook and put forward practical problems to arouse students’ thinking so that students can strengthen the learning of curriculum knowledge in the thinking process and achieve the ideological and political teaching objectives. Therefore, when teachers design the ideological and political teaching of the “Probability Theory and Mathematical Statistics” with the idea of reverse teaching design, they first need to fully understand the teaching content of each chapter of the course and anticipate the objectives of ideological and political teaching in advance.

Secondly, teachers need to fully utilize the teaching content in the course, complete the teaching design, realize the integration of teaching content and ideological and political knowledge, and transfer ideological and political knowledge through the course teaching ^[9].

4. “Probability Theory and Mathematical Statistics” course ideological and political teaching implementation strategy

4.1. Explore ideological and political elements

The course “Probability Theory and Mathematical Statistics” comprises seven chapters and 48 hours. In

carrying out curriculum teaching, if teachers want to realize curriculum ideology and politics, they need to dig deeply into the ideological and political elements in the curriculum. Digging out valuable ideological and political elements can also show teachers' teaching ability. In the course of "Probability Theory and Mathematical Statistics," teachers can combine the formation process, development history, celebrity anecdotes, life examples and other contents of relevant knowledge with ideological and political knowledge, combine teaching content with ideological and political knowledge, and introduce it into the classroom at the right time and in the right way to perfectly integrate curriculum knowledge with ideological and political knowledge. For example, in the content of "Random Events and Probabilities," teachers can enumerate random behaviors existing in real life to stimulate students' interest in learning, explain to students the stories of relevant statisticians, explain the formation process of relevant concepts and learn the spiritual quality of statisticians and their mentality of exploring concepts.

Students in the course study and daily life should also be persistent with the courage to explore the attitude towards learning to overcome the problems in life. In the teaching of "Random Variables and Numerical Characteristics," when explaining the concepts of mathematical expectation and variance to students, students can be conveyed that "2020 is the year of the decisive battle against poverty" so that students can understand national policies and cultivate students' patriotism. Students can also be introduced to applying mathematical expectations in real life. Besides, it can also make students look at things in life in the spirit of mathematics^[10].

4.2. Introduce the history of development and anecdotes of academician

Before the formal start of the course "Probability Theory and Mathematical Statistics" to stimulate students' learning interest and deepen students' cognition of the course, teachers can introduce the concept, development history and practical application of "Probability Theory and Mathematical Statistics" to students in advance, and introduce academician Xu Bao and discuss his achievements in pioneering the teaching of probability theory and mathematical statistics. The academician

is a pioneer in the world of statistics, and his effort in mathematical research insisted on carrying out scientific research even when he was in a poor state. He has trained a number of scientific research talents for China. In the process of story-telling, teachers can focus on the history of the development of probability theory and mathematical statistics in China so that students can understand the history of development, feel proud and honored for China's achievements and stimulate students' patriotism. From the story of academician Xu Bao, students can learn the scientific spirit of dedication and the spirit of exploration^[11].

4.3. Introducing fable stories

Bayes' Formula is an important part of "Random Events and Probability" in the course of "Probability Theory and Mathematical Statistics." Before explaining Bayes' Formula, teachers can introduce the fable of "Wolf is coming" in class and ask students, "Why did no one come when the child called for help for the third time?" After students discuss the problem, the problem is transformed into a mathematical problem, Bayes' Formula is introduced, and the problem is analyzed accordingly^[12].

Based on Bayes' formula, if the villagers' trustability to the shepherd boy is 0.8, the probability of the trustworthy shepherd boy lying is 0.1. The probability of the untrustworthy shepherd boy lying is 0.8. Then, after the shepherd boy's first lie, the credibility will drop to 0.333; after the second lie, the credibility will drop to 0.059; and after the villagers hear the shepherd boy crying for help for the third time, the villagers will not trust the shepherd boy. Because the credibility is low, so the villagers decide not to help him. After analyzing the fable using Bayes' formula, teachers can ask students how they feel about it. The main reason why teachers combine Bayes' Formula with fables is that teachers hope students can understand in classroom learning that one's view of people or things will be constantly modified by other people's behaviors. The teaching of Bayes' Formula is not only the teaching of mathematical formulas but also the guidance of students' world outlook and methodology so as to warn students to be honest and trustworthy and improve their credibility in the eyes of others^[13,14].

4.4. Combining actual life

When teachers carry out the course of “Probability Theory and Mathematical Statistics,” they can also use the events in real life to introduce ideological and political elements, realize the integration of ideological and political ideas in the course, and cultivate students’ ideological and political literacy. For example, when teaching “Mathematical Expectations” in “Numerical Characteristics of Random Variables,” teachers can introduce real-life examples.

For example, in the lottery sales activity, the price of each ticket is 2 yuan. In 10 million tickets, there will be 20 first prizes with 200,000 yuan, 1,000 second prizes with 3,000 yuan, 2,000 third prizes with 1,000 yuan, and 1 million fourth prizes with 2 yuan. Combined with the knowledge of the calculation class, the average return to buy a lottery ticket is 1.1 yuan, and the average return here is an exponential expectation. It means that as long as you buy a lottery ticket, you will lose 0.9 yuan. As a small probability event, the more you buy does not mean the greater the chance of winning, but the more you will lose. By combining this real-life example with the course knowledge of “Probability Theory and Mathematical

Statistics,” students can be warned to a certain extent that is, they should not think of getting rich overnight by buying lottery tickets, which is a small probability but should make money down-to-earth, guide students to form correct life values and guide students to treat real-life problems with mathematical thinking^[14].

5. Conclusion

To sum up, every teacher should shoulder the task and mission of ideological and political education in the classroom, which is the main place to carry out teaching activities and lead to the goal of moral education. From the perspective of “Probability Theory and Mathematical Statistics” courses, teachers should apply the combination of “Probability Theory and Mathematical Statistics” course teaching with ideological and political teaching, naturally integrate ideological and political elements into the course teaching, correctly guide students’ ideological concepts and political literacy, and cultivate them into high-quality talents.

Disclosure statement

The author declares no conflict of interest.

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