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Some Thoughts on the Teaching of "Probability Theory and Mathematical Statistics"

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Abstract: At present, in today's information explosion, how to let students know more about this course through introduction courses, so as to increase students' interest in learning this course, and how to make students aware of the importance of this course, and from which perspectives the teaching content And the reform of teaching methods is a question that every teacher of probability theory and mathematical statistics must think about.

Keywords: Probability Theory and Mathematical Statistics; Introduction Course; Teaching Reform

Probability theory and mathematical statistics is a basic mathematics course compulsory for most college students of science, engineering, medicine, finance and economics. It is closely related to our daily life. It is a mathematical subject that studies and reveals the statistical regularity of random phenomena. Due to its special randomness, it is used in natural sciences, social sciences, industrial and agricultural production, finance, and economics. Widely used, and based on it, many new interdisciplinary and marginal subjects have been generated.

Next, based on my many years of teaching experience in probability theory and mathematical statistics, I will talk about some thoughts about this course.

1. Why give an introduction course of probability theory and mathematical statistics

We agree that it is necessary to introduce the historical origin and development direction of this course in the introduction course. Understanding history is to better understand the content to be learned, and at the same time, it can stimulate students' interest and thinking about the subject through history. The introduction of development direction can guide students to think deeply about the subject.

For example, it can be designed like this in the introduction class: first talk about the origin of probability theory, let students understand that probability theory has a disgraceful background-gambling, but bad things can turn into good things, which promotes the emergence of a discipline. Then I will talk about the development of probability theory in various stages. The focus can be on the development in our country. For example, the research of probability theory in our country started relatively late, and the pioneer is Xu Baoquan. In the summer of 1957, Mr. Xu held a workshop on probability and statistics at Peking University. Since then, my country's research on probability and statistics has made great progress. Then I will talk about the brief history of mathematical statistics. Finally, through some specific examples, students will deeply realize that this subject penetrates into all aspects of our lives.

A good introduction course can make students fully realize the importance and necessity of learning probability theory and mathematical statistics, encourage students to use the knowledge they have learned to analyze and solve practical problems, and make the originally boring teaching theory vivid and interesting, so that students have a strong interest in learning this course and

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improve the teaching effect.

Through the introduction class, let students understand the principles of our course: clarify ideas, guide and inspire, elaborate and practice, and cultivate abilities. Adopting the teaching method of "teaching, demonstrating, and constructing flexible applications that complement each other", combining lectures, discussions, exercises, etc., to improve students' ability to use the knowledge they have learned to analyze and solve problems flexibly.

2. Reform ofteaching contents of the course probability theory and mathematical statistics

Probability theory and mathematical statistics is a highly practical course. It is an application-oriented subject. The application of probability and statistics knowledge and methods is almost in every field. At present, in the teaching of probability and statistics, students generally lack an overall understanding of the internal relations between the content of the course. They often feel unable and powerless to deal with practical problems. Teachers are urgently needed to give pointers and introductions on the methods and ideas of specific practical problems.

For a long time, my country's engineering education has misunderstood the positioning of talent training goals. It pays too much attention to the training of academic and theoretical talents, and emphasizes theory teaching and neglects practical training. As the cradle of engineers, engineering universities basically train "engineers" according to the model of training "scientists" or "engineers". Engineering training for the front lines of production and industry needs is insufficient, and students' ability to solve practical engineering problems is relatively lacking. Taking advantage of the country's emphasis on "application-oriented and innovative talent training", a large number of colleges are actively promoting the reform of their own professional curriculum systems, starting with the reform of teaching content.

For the course "probability theory and mathematical statistics", we mainly reformed the teaching content from two aspects. One is to reduce the theoretical hours of teaching and increase applied teaching. By merging the teaching content and accelerating the teaching progress on the premise that the students have part of the knowledge in high school, the goal of reducing the teaching theoretical hours can be achieved. The second is to increase the practicality of the course based on modeling. Because mathematical models can predict and analyze the regularity related to this research phenomenon, mathematical modeling has been fully integrated into various fields of scientific research. Probabilistic model is a very important kind of mathematical model. The organic integration of mathematical modeling ideas and methods into the teaching of probability and statistics is very important for students' creativity, imagination, observation, abstract thinking and practical ability. In teaching, you can add several cases from scientific research or life research to reflect the whole process of teaching model with probability and statistics knowledge, namely "problem-mathematical model-solution-result analysis-modification model-application". For example, the introduction of a comprehensive case of "analysis of demand for a certain commodity" can use the principle of multivariate statistical inference; the introduction of a comprehensive case of "analysis of rainfall observed by weather stations" uses the principles of correlation analysis and regression analysis. Through these case teachings, students have personally experienced the mathematical modeling process using probability and statistics knowledge, and deepened their understanding of probability and statistics knowledge.

An important task in the teaching of probability theory and mathematical statistics is to cultivate students' mastery and use of statistics, that is, the ability to apply what they have learned, so as to finally form a good statistical quality. After corresponding training, they can master modern computers. Data processing methods are very important to form good statistical literacy.

3. Theteaching method reform of the course Probability Theory and Mathematical Statistics in the new situation

Under the strong call of the country to emphasize the introduction of ideological and political courses into the classroom, in the general environment of college courses ideological and political into the classroom, the original "chalk + blackboard" teaching method is changed, and the online and offline mixed-level teaching mode is adopted,"Students as the main body, problem-centered", according to students' different foundations, different majors, and differences in high school liberal arts and science electives, set up the same types of problems with different levels of difficulty, take care of the abilities of students of different levels, and guide students actively participate in the discussion and study of problems, and at the same time carry out patriotism education, mental health education and dialectical materialism to students in the course of teaching, and carry out moral quality education to students through some practical examples to enhance teacher-student interaction and stimulate Students learn motivation and improve their learning passion and efficiency.

In terms of teaching methods, we use the current high-tech methods, on the basis of traditional teaching, through the use of students' favorite teaching methods such as cloud class, Mu Class, Tencent Class or QQ group, WeChat group live broadcast, and

online platform discussion methods. To ensure that students can understand and master the learning content to the greatest extent. Through the reform of these teaching methods, it is possible to achieve the effect of cultivating people and moisturizing things silently, and to better implement the teaching mode under the Internet + curriculum ideological and political mode, which can broaden students' horizons, develop students' discovery of problems, the ability to solve problems, so as to achieve better teaching results.

Under the new situation, teachers' lesson preparation requirements have also changed. Teachers must first combine cloud classes, MOOCs, courseware and textbooks to formulate detailed weekly teaching plans, and organize and structure the teaching content of each section. Secondly, teachers conduct teaching supervision through designing exercises, test questions, and questionnaires in the cloud class and the Mu class. Subsequent homework assignments will not only strengthen students' understanding of knowledge points, but also lead students to reflect on their own learning. At the same time, every time the students do not know the content, they will answer questions in the QQ group and WeChat group in time. Finally, through questionnaire surveys and real-time feedback from students, we can find and solve problems in time. This will not only help students to watch the playback multiple times when some knowledge is not understood, but also design questions during lectures, answer in real time, and effectively improve interaction, to stimulate students' interest in learning. Therefore, under the new teaching method, it seems that teachers have escaped from the teaching pains of "working hard for an hour, looking at each other like a stranger" and "not thankful". In fact, the task of teachers is heavier and more demanding.

4. Conclusion

The above are the author's immature opinions on the teaching process of "probability theory and mathematical statistics". I only made some superficial research and analysis. I hope it will be helpful to the teaching reform of "probability theory and mathematical statistics". It is conducive to the improvement of the teaching quality and level of probability theory and mathematical statistics.

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