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Research Ideas and Methods of Probability Theory and Mathematical Statistics Teaching

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Abstract **– The course of "probability theory and mathematical statistics" as a basic course in adult higher education in mathematics, improving the teaching methods and teaching thought is an essential link in the curriculum construction, case teaching method is the method which is especially suitable for "probability theory and mathematical statistics" teaching.**

Keywords **– "Probability Theory and Mathematical Statistics", Teaching's Thinking Method, Case Teaching Method.**

I. INTRODUCTION

"Theory of probability and mathematical statistics" is an important tool for people to understand the uncertainty mathematics phenomenon, is to study the law of random phenomena mathematics. This course is a basic course in adult higher education, has the important practical significance. Its theory and method has been widely used in industry and agriculture, military and other fields. It plays a more and more important role in science, technology and human practice activity. In 2012 we declare provincial brand of adult higher education professional journal of mathematics and applied mathematics, including the theory of probability and mathematical statistics which is a key course project, team members according to the plan of project construction has carried out a large number of curriculum construction work, in the teaching way of thinking has achieved certain results [1].

This course for students of the adult higher education is very important, however, because of this course is a follow-up class, the teaching content includes mathematical analysis, higher algebra, complex variable function and the application of real variable function knowledge. Because of a variety of reasons part of our students have poor learning foundation, so their learning "theory of probability and mathematical statistics" often feel difficult. Students often cannot grasp learning methods, which make them gradually lose interest and confidence in learning this course, so that many students have no alternative, when they are going to work in the face of new teaching material "probability theory and mathematical statistics" of nowadays middle school [2].

II. THE THINKING METHODS OF TEACHING IMPROVEMENT

For several years, how to improve the teaching mode, improve the students' interest in learning this course, and improve the teaching effect of this course, make students really learn useful knowledge of probability and statistics, had been an important subject of our exploration and practice. We made the following efforts:

A. According to the needs of the elementary education curriculum reform, teachers adjust teaching plan. As the elementary education curriculum reform gradually deepening, "theory of probability and mathematical statistics" has entered the elementary and middle schools. Therefore, we further strengthen the new teaching material of middle school mathematics related the content of the theory of probability and mathematical statistics, such as, classical scheme, Bernoulli scheme, binomial distribution and normal distribution are the focus of the teaching content, even add some middle school new curriculum adaptation after instance teaching examples and exercises. This kind of teaching methods to make the students feel interested in strong pertinence, and make them clear some concepts of probability and statistics knowledge, as they are in high quality in the future as this section as well as the content of the skilled use of statistical methods in the educational reform, the research lay the foundation.

B. According to strengthen the multimedia teaching, teachers improve teaching efficiency. In order to convey more information in the limited class teaching time, to improve the teaching quality and effect, we make full use of modern teaching condition, promoting the application of electronic teaching and multimedia teaching. In opening the probability theory and mathematical statistics in the middle school mathematics content knowledge lecture, used the courseware, the teaching process more intuitive, image, vivid, greatly improving the teaching efficiency and achieve twice the result with half the effort. Students generally reflect both expanded the amount of information, and vivid, image, concrete.

C. According to application of a variety of teaching methods and means, teachers strengthen the teaching effect. We pay attention to the heuristic teaching in the teaching, the content before and after, through the detailed interpretation of the principle of probability and statistics with the instance, strengthen students understanding of the concept, speaks the lectures focus on the concept, ideas, methods and results; to solve the problem. And through the appropriate exercise, he learned to make the students master. In this way, the students' overall thinking more clearly, the good teaching effect."Theory of probability and mathematical statistics" although is a branch of mathematics, but it is different from the other mathematics discipline, is that it is very intuitive, the subject inside most of the concepts are directly from the practice. Thought method, the principle, the formula of probability and statistics, such as the introduction of the theory, can stimulate students interest and make them most impressive is introduced from the close to real life problems that case, if meet the problem can't solve with existing theories,

means that people must create new theory [3].Case teaching with traditional teaching is the difference between the students on campus will be able to contact and learn a lot of practical problems, make up the lack of practice and the defects of lack of practical operation ability. So in the teaching of "theory of probability and mathematical statistics" should have case everywhere, at any time can kindle the light of students' wisdom.

III. Case Teaching Process

Case teaching is a good teaching method. Here we explain the actual case teaching process.

A. Case description

A person who can with 90% accuracy to identify two different types of wine, and then puts forward suggestions on promoting the sale of what kind of wine.

To test his ability of distinguishing wine and decide whether to employ, the company tests of the people by the following method: let him taste of two kinds of wine 10 times, each sample interval for 5 minutes, and the results are given to identify. If the person at least six times in 10 times to identify correctly, the company hired him [4].

Here are the main problems:

Can the above method make the company away from pretender fool?

If he is taste, can he be employed?

B. Case analysis

In order to answer the first question, we assume that this person is speculation, he can only distinguish between the wine with the probability of 0.5 in each product test, assuming that the correct number is X , by using the binomial distribution:

$$P(X=k)=C_{10}^{k}p^{k}(1-p)^{10-k},(k=0,1,2,\cdots,10).$$

Calculate the probability of $k=6,7,8,9,10$, this method was used to judge whether the company is fool.

For your second question, we believe that this person had a 90% accuracy to identify two different types of wine, we calculate the probability of $k=6,7,8,9,10$ by using the binomial distribution ,in order to determine if he is taste, can he be employed?

C. Case answer

Assuming that this person is speculation, he can only distinguish between the wine with the probability of 0.5 in each product test, assuming that the correct number is X , by using the binomial distribution, we calculate the probability of $k=6,7,8,9,10,$ that is

$$P(6\le X\le 10)=\sum_{k=6}^{10}C_{10}^{k}p^{k}(1-p)^{10-k}$$
$$=\sum_{k=6}^{10}C_{10}^{k}(0.5)^{k}(0.5)^{10-k}.$$

Through the look-up table this probability is 0.3770. Therefore, if he is totally guess, he has the probability of 0.3770 to be hired.

If he can distinguish between the wine with the probability of 0.9 in each product test, we calculate the probability of $k=6,7,8,9,10,$ that is

$$P(6\le X\le 10)=\sum_{k=6}^{10}C_{10}^{k}p^{k}(1-p)^{10-k}$$
$$=\sum_{k=6}^{10}C_{10}^{k}(0.9)^{k}(0.1)^{10-k}.$$

Through the look-up table this probability is 0.9984, therefore, if he is totally taster, he has the probability of 0.9984 to be hired.

IV. Conclusion

In social production and life, there are a lot of uncertainty of mathematical problems, which contains the deterministic conclusions, for guiding people engaged in social production ,and life has the very vital significance, relating to a lot of things in the world.. Job resume would require the sea, because in many resume, no matter how good you are ignored, throw a resume is much more a job interview, the probability of more employment. Two of a kind of love cannot make the probability of male and female both sides more or less always there is a will, the love of two people can't be equal. Gambling is a game of probability and mentality, the movie "rain man" in the hero intellectual disabled but memory, it can make him quickly work out the probability of placing a brand in gambling. Probability of scholars don river quietly, "the author also carried on the textual research, the book was published when signed written by famous author Sholokhov, someone said shortly after publishing the book from the Cossack writer Krioukov plagiarism. In order to make it clear who are the real author, the scholars adopt the method of calculating styles to research, from the average sentence length, word selection, structure analysis, word frequency statistics and analysis, finally confirmed that the author is really Sholokhov. So Marx said: a science only in successful use of mathematics, can be up to the real perfect proportions.

The construction of the key course of "probability theory and mathematical statistics" is not a short duration of time. The optimization of teaching content, teaching method improvement, the writing of the textbook and perfect, the construction of the network environment, etc., all need a long time of accumulation, a lot of people work together would accomplish this task[5].

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