Research and Application of Probability and Statistics in Practical Teaching

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Abstract: With the progress of today's society, the policies in the field of education have also been improved, including mathematics education. As the content of probability and statistics has increased significantly in mathematics textbooks, the teaching syllabus has also been constantly adjusted to adapt to the current mathematics teaching reform, and the teaching methods have also been constantly changing. Although the teaching content of probability and statistics has been gradually expanded and distributed in today's mathematics teaching, there is still a lot of room for improvement in terms of textbook content, teachers' teaching and students' learning. This paper expounds the mathematical thinking and characteristics in statistics and probability, roughly summarizes the problems and obstacles in mathematics teaching, and puts forward the teaching principles and strategies that should be paid attention to in mathematics teaching, in order to cultivate students' mathematical thinking through the teaching of probability and statistics, excavate the deeper connotation and significance contained in probability and statistics, and provide practical value for the research and application of mathematics teaching.

1. Introduction

Nowadays, all walks of life are constantly adjusting their strategies to meet the development of the times. The continuous development and implementation of the new curriculum reform plan requires that mathematics education keep pace with the times. Among them, mathematics, as an important subject of thinking training, should be paid more attention to. Mathematics teaching requires teachers to timely change their teaching thinking, combine and use a variety of teaching methods for classroom teaching, and no longer adhere to traditional teaching methods, As a major field of mathematics teaching and learning, probability and statistics are worth creating a novel classroom based on the actual needs of students. Through the study of the content of probability and statistics, students can constantly understand and master the ideas contained in it, and then achieve the understanding of the essence of things, so as to apply the knowledge and thinking learned to real life, so that students have a purpose Enter the learning and discussion process of probability and statistics course with a task to promote students' understanding of the original mathematical structure and integrate the new mathematical cognitive structure.

2. Basic characteristics of probability statistics

2.1. Uncertainty

The most prominent feature of probability and statistics is uncertainty. The reason for the research and exploration of statistics is precisely based on this feature. Our life is full of all kinds of uncertain phenomena, that is, random phenomena. The main content of probability statistics is the reasonable statistics and prediction of random phenomena. The main research object is the random phenomena that can be repeated in a large number, but also the research of the random phenomena that cannot be repeated. The external form of statistical uncertainty is actually variability.[1] In the past teaching, three aspects of training were often neglected: students' understanding of the concept of uncertainty was ignored, and students were not well guided to study the uncertainty in probability; Lack of understanding of the things that students can't accomplish, and only focus on the tasks they can accomplish; Lack of cultivation of students' ideology,

2.2. Experience

The research of probability and statistics, rather than the analysis of the data itself, needs to be summarized in combination with the specific actual situation and previous experience. In other words, probability and statistics cannot exist independently from the reality. Therefore, the conclusions of the research are also to explain the actual situation. Based on this, in the learning and research of probability and statistics, we should combine the actual experience, link the problem with the actual situation, and substitute the actual situation in the learning and research process, rather than just perform simple operations on the data. We should distinguish it from other knowledge learning in mathematics, and can not only solve the problem by emphasizing the use of algorithms and formulas [2].

3. The Present Situation of Probability and Statistics in Practical Teaching

3.1. Inadequate innovation in teaching concepts

"Statistics and probability", as the main means of studying the data in real life and the random phenomena in the objective world, helps people to make reasonable inference and prediction by collecting, sorting out, describing and analyzing the data, and depicting the possibility of occurrence of events, and making mathematical description of a large number of random phenomena in nature. However, in the current stage of mathematics teaching, some teachers' concepts have not yet been completely reformed, and they have not fully understood the ideas, methods, principles, and other aspects contained in probability and statistics, making the teaching mode still stuck in the traditional stage, which will make teaching appear dull and rigid. On the one hand, students cannot fully exert their subjective initiative in this educational model, and cannot spread their own thinking; On the other hand, in such a teaching environment, teachers and students can't communicate properly, and teachers can't grasp students' understanding of the teaching materials and, which makes the teaching effect greatly reduced, and it is difficult to realize the application of probability and statistics in actual mathematics teaching. Such an educational method is difficult to activate students' thinking, and ultimately students only stay at the level of "learning" rather than "learning".

3.2. Inadequate penetration of mathematical thinking

With the requirements of the new curriculum reform becoming more and more refined, the

mathematical textbooks have also changed the focus of the teaching of probability and statistics. In the past, probability and statistics paid too much attention to the classical probability calculation, and also too much attention to the rigor of the theory. Now they gradually began to pay attention to the cultivation of students' mathematical thinking, aiming to enable students to form a correct methodology through the understanding of random phenomena and find the focus of the study of probability and statistics. In learning, random thinking and statistical thinking are gradually formed. However, in the current stage of mathematics teaching, many mathematics teachers do not pay enough attention to the broadening of students' knowledge, which leads to a great reduction in the importance of mathematical thinking. In the process of teaching, the phenomenon of lack of knowledge extension and contact with reality is everywhere. They often only pursue teaching speed in the teaching process, and only want to teach the scheduled course content in order. Finally, the scope of knowledge that students learn is narrow and lack of openness, and teachers are also unable to cultivate students' mathematical thinking according to the actual situation. Therefore, students can not actively integrate into the classroom, and cannot achieve thinking penetration teaching. Therefore, students will have little understanding of probability and statistics learning, which makes the significance of thinking training for probability and statistics teaching become very small.

3.3. Inadequate update of teaching methods

The core of probability and statistics research is to understand the statistical regularity hidden behind random phenomena. The key point is to observe the random phenomenon and connect the randomness of the results of the random phenomenon with the regularity reflected by a large number of random phenomena. Probability and statistics are the mathematics describing randomness and statistical regularity. According to the connection between the contingency and regularity of probability statistics, in order to make students have a more intuitive and clear understanding of this connection in the teaching process, teachers should have corresponding simple experiments in the classroom so that students can learn and recognize. With the development of the times, educational tools emerge in an endless stream. The use of media or electronic tools in the teaching process can sometimes make the teaching effect twice the result with half the effort. In the teaching process, multimedia or electronic devices cannot be introduced, which can make the teaching appear dull. When teachers teach some knowledge points that require operation or hands-on experiments, oral explanations alone cannot achieve results. Students also find it difficult to comprehend the joy of learning, resulting in a relatively shallow understanding of probability and statistics. In this case, discussing the application of probability and statistics in actual teaching becomes inadequate.

4. Principles and countermeasures to be observed in probability and statistics teaching

4.1. Create a harmonious learning environment to support mathematics learning

The environment can affect students' emotions and thoughts silently. If we create an interesting and warm environment, students will naturally feel relaxed and comfortable in it, and will also be affected by this warm and comfortable atmosphere, making the whole emotional development become positive, which will greatly help students learn the originally boring and difficult mathematical content. Therefore, mathematics teachers should pay attention to creating an interesting learning environment to support students' mathematics learning. In the teaching of probability and statistics, random thinking should be used throughout the whole process of probability and statistics teaching, so as to build a grid of mathematical ideas. Whether for beginners or students who have been exposed to the study of probability and statistics, learning will inevitably feel difficult and difficult to understand. This is because probability and statistics have strong flexibility. In the process

of learning, students are not only required to understand what they have learned, but also to have a deep understanding and mastery of statistical thinking.

The teaching focus of probability and statistics is not to require students to memorize formulas, but to highlight the characteristics and functions of statistics, and avoid turning the learning of this part into the practice of numerical calculation. In teaching, we should set up a reasonable problem situation, let students understand the role of statistics in decision-making, and think about data-related issues from the perspective of statistics. In addition, teachers can start with some small games related to the course to activate the classroom atmosphere. When teaching the course, they should emphasize the interaction between teachers and students, and should form a situation of student-centered and teacher-centered, and encourage students to actively speak in the class and express their views; Abandon the teacher-centered situation in traditional teaching. At the same time, the communication between teachers and students should not only be reflected in language, but also require ideological resonance; Teachers should experience students' psychological activities through their external performance, and should not over-implement mechanical exercises and exercises.

4.2. Increase experimental teaching and promote mathematical thinking penetration

Stochastic thinking and statistical thinking are the two most important ideas in probability and statistics. The core of random thinking is to understand the regularity of certain random events, that is, inevitability, through the contingency of certain random events. Establish a connection between contingency and necessity, and see the essence of necessity in the development process of things through a large number of random phenomena. Random test is an extremely important method in random thinking, such as coin toss test (Pearson), needle throw test (Pufeng), touch ball test, etc. are all random tests conducted to study random phenomena. The statistical thought is composed of three aspects: statistical method, data collection and processing, and result inference and summary. With the development and improvement of statistics, its research content has become very rich and has formed many branches, such as sampling survey, experimental design, Bayesian method, regression analysis, etc. No matter what kind of idea, in order to verify the correctness and error of the idea, a lot of experiments need to be done.

Therefore, in the teaching of probability and statistics, teachers can hand over simple experiments to students. For example, divide students into groups, and each group will do the same or different experiments, such as coin toss, ball touch, etc. Each group will record and count the results of each experiment. In such experiments, students can better and faster understand the meaning of the two ideas, and can effectively deepen the understanding of knowledge.

4.3. Adopt various teaching methods to achieve interesting learning

In the teaching of probability and statistics, teachers should pay attention to the combination of the development of probability and statistics thoughts and the mastery of methods. First of all, let students master the basic mathematical methods by learning knowledge. Students should not only stay on the simple list of knowledge, but should connect the learned knowledge points through mathematical methods to form certain mathematical thinking. This is very important for the study of probability and statistics. In order to enrich students' learning experience in statistics class and stimulate students' learning interest, teachers can timely change the original teaching methods, use new teaching methods to mobilize students' learning interest at all times, guide students to obtain rich probability statistics learning experience, and achieve interesting learning. Teaching methods can include scene simulation, game introduction, micro-class assistance, etc. Teachers should combine specific teaching contents with teaching methods. In order to optimize teaching activities and increase teaching interest under the optimal combination. We should pay attention to the connection between

probability and statistics knowledge and realistic models. Teachers can list some realistic models in connection with students' life background.

For example, when preparing lessons, teachers can collect data in advance based on the students' height or lottery tickets, use electronic equipment to conduct simple analysis and modeling, and display them in class, so that students can have a clearer understanding of probability and statistics learning. This requires teachers to contact reality and dig into practical examples when preparing lessons. At the same time, teachers should arrange teaching activities in the logical order of knowledge, method and thought in the process of teaching new knowledge, so as to achieve the expected teaching effect.

5. Conclusion

Probability statistics is guided by rich background, ingenious thinking and interesting conclusions. It introduces its basic concepts, methods and conclusions step by step. From the analysis of this article, if students want to master the course learning well, they should first start from thinking cultivation. Only when students form corresponding mathematical thinking can the teaching of probability and statistics break through the obstacles. Since probability and statistics is an uncertain subject, teachers should formulate effective teaching strategies according to the content of the textbook and the actual situation of students; In view of the characteristics of probability and statistics, teachers should change their previous teaching methods and combine more with the reality, cultivate students' ability to solve practical problems and innovative consciousness.

References

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