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Analysis of the Ways and Strategies for Integrating Ideological and Political Courses into Probability Theory and Mathematical Statistics Course Teaching

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Abstract: Probability theory and mathematical statistics are a basic mathematics course in science and engineering majors in higher education institutions. The course has a wide range and is highly applicable. How to build ideological and political courses well in this course, organically combine the content of the professional course with ideological and political elements to improve students' professional literacy and ideological and political literacy is a question worth studying. This paper analyzes several aspects of ineffective ideological and political integration in probability theory and mathematical statistics courses, and proposes ways and strategies for integrating ideological and political into probability theory and mathematical statistics course teaching in curriculum.

1. Introduction

Probability theory and mathematical statistics are core basic courses in colleges and universities' majors such as mathematics and applied mathematics, computer science and technology, and veterinary medicine, and are also prerequisite courses in emerging fields such as data science and big data technology, machine learning, and artificial intelligence. As an important branch of mathematics, probability theory and mathematical statistics not only occupy a core position in the field of theoretical research, but also play an irreplaceable role in many fields such as engineering technology, social economy, and artificial intelligence.

In June 2020, the Ministry of Education of the People's Republic of China issued the "Guiding Outline for the Construction of Ideological and Political Curriculum in Higher Education Institutions", requiring colleges and universities to deepen education and teaching reforms, fully tap ideological and political resources of various curriculums, organically integrate them into curriculum teaching, give full play to the educational role of each curriculum, and comprehensively improve the quality of talent training. It is necessary to integrate moral education into ideological and political construction in ideological education, cultural knowledge education, social practice education and other links, and run through all links of higher education. The outline requires colleges and universities across the country to "promote ideological and political construction in a

classified manner based on professional characteristics". It is particularly important to do a good job in ideological and political construction of courses such as probability theory and mathematical statistics.

Chen Yanfeng [1] selected five knowledge contents including the central limit theorem to explore ideological and political elements, aiming to help students deeply understand dialectical materialist ideas such as quantity and deterioration, universal connection between opposites and seeing the essence through phenomena. Wang Qian[2] uses the full probability formula and Bayesian formula as teaching cases to explore how this course carries out ideological and political ideas in teaching. Wu Mingzhen [3] builds the ideological and political teaching path of the "Probability Theory and Mathematical Statistics" course based on the characteristics of probability theory and mathematical statistics courses and combined with the talent training positioning of science and engineering majors, and constructs the "one core, three orders, four dimensions and five steps". Wu Danyang [4] discussed the integrated online and offline teaching model, using case teaching, statistical software and ideological and political courses, stimulate students' interest in learning, and cultivate students' understanding of knowledge and problem-solving ability. He Bangqiang [5] revealed the ideological and political elements in probability statistical knowledge during the teaching process, and instilled materialist concepts in students in an implicitly infiltrated manner, so as to achieve the resonance and integration of knowledge imparting and ideological and political education. Zhang Zhenhua [6]'s article focuses on cultivating moral cultivation, rooting patriotism, increasing students' knowledge, strengthening engineering ethics education, and cultivating a practical work style. Zhang Yu [7]'s article discusses the design of ideological and political cases of courses, broadens students' knowledge reserves, stimulates students' interest in learning, and promotes the improvement of students' ideological and political quality, thereby achieving the effectiveness of curriculum educating. Xia Qiang [8]'s article discusses the implementation strategies and practical cases of ideological and political cases of curriculum in the teaching of advanced mathematical statistics courses. Wang Wei[9] explained how to integrate ideological and political elements such as ideas, moral norms and scientific spirit into the curriculum to enhance the effectiveness of ideological and political education in the curriculum. Min Jianzhong [10] summarized the experience of ideological and political construction of courses in probability theory and mathematical statistics in medical schools. Chen Zhenzhou[11] organically combines "knowledge imparting" and "ideological guidance", and realizes the professional training task of cultivating morality and cultivating comprehensively developed information technology professionals. Sun Hongyan [12] analyzed a new teaching model with students as the main body, ability evaluation as the guide, and ideological and political elements integrated into the entire teaching process.

Based on the predecessors, this article discusses the problems existing in the construction of ideological and political construction of probability theory and mathematical statistics courses, and thinks about and summarizes some ways and strategies for integrating ideological and political courses into probability theory and mathematical statistics course teaching.

2. Current status of ideological and political courses in probability theory and mathematical statistics

Under the situation where universities across the country fully implement ideological and political courses, teachers and professional courses in all universities are actively exploring the ideological and political construction of courses for professional courses. Under the educational concept of "three-dimensional education", the curriculum requires high-level, innovative and challenging. Various professional courses are also exploring the research on diversified collaborative education models, which has also laid some foundation for the ideological and

political construction and development of professional courses. However, because core professional courses such as probability theory and mathematical statistics are too theoretical, many college teachers often feel that they have no way to focus on their ideological and political courses in such professional courses. There are mainly some current situations.

(1) Ideological and political goals of course teaching are unclear and unnatural integration

Probability theory and mathematical statistics courses are core basic courses in mathematics. The courses are difficult to teach and require students to have a solid grasp of professional knowledge in basic courses such as calculus, linear algebra, and analytical geometry. During teaching, teachers mostly focus on the explanation and practice of theorems and principles. The teaching intensity is high, and it is often difficult to take into account the functions of the course educating people.

For example, when explaining Bayesian formulas, it mainly focuses on the derivation of formulas. Without combining actual cases, students cannot be guided to establish correct values. Although some subsections try to set ideological and political goals, the integration of ideological and political goals and curriculum teaching goals is very stiff. For example, when explaining hypothesis testing, some patriotic content is forced to explain the curriculum education and ideological and political education. In order to present ideological and political education, the unnatural integration of courses will not only fail to achieve ideological and political education in courses, but may even affect students' mastery of professional knowledge.

(2) The ideological and political elements in course teaching are not thoroughly explored, and the content is not updated in time

Probability theory and mathematical statistics are a subject that is closely related to life, and the course actually contains very rich ideological and political elements. But many times, in course teaching, the derivation and application of formulas is only explained according to the content of the textbook, and does not guide students to think about the accidents and necessities presented behind formulas and theories. For example, in the explanation of t distribution, only the theory of t distribution is explained, and no background of discovery of t distribution is explained, a good ideological and political point of course is lost. With the progress of society and the development of the times, the application fields of probability theory and mathematical statistics are also expanding, but many teachers in the course design still talk about very old cases and do not grasp the hot topics of current affairs. For example, in the application cases that explain the expectations of mathematics, the textbook explains the cases of recruitment in World War II. Such cases are a bit outdated. In the course design, mixed nucleic acid testing during the new crown epidemic can be used as a breakthrough point, so it is easier to find the entry point for ideological and political courses.

(3) Single teaching methods and lack of ideological and political guidance in practical links

The course on probability theory and mathematical statistics is a discipline that combines theory and practice. Some teachers still adopt traditional teaching methods in curriculum teaching, with teachers as the center of teaching implementation, and students passively accept knowledge. This single teaching model is difficult to stimulate students' interest and enthusiasm in learning, and is even more unfavorable to the development of ideological and political courses. In the practical process, we only focus on the cultivation of practical operation skills, but ignore the guidance of ideological and political education in the course, and do not guide students to think about the scientific spirit, teamwork and other ideological and political content reflected in the experiment process, which leads to the disconnection between practical teaching and ideological and political education.

(4) Teachers lack ideological and political literacy and lack interdisciplinary abilities

As a university teacher, you can basically do it by mastering the professional knowledge in your field. However, to teach ideological and political courses well, it is not enough to just master professional course knowledge. Some teachers do not have an in-depth understanding of the

connotation, goals and methods of ideological and political education, and it is difficult to effectively integrate the elements of ideological and political education in curriculum teaching. For example, during regression analysis, teachers can clearly teach the principles and methods of regression analysis theoretical models, but they cannot combine them with knowledge in the fields of economics, sociology, etc., nor can they dig out the ideological and political elements contained in it, which limits the depth and breadth of ideological and political construction of courses.

(5) Improper standards for ideological and political evaluation of courses

As core professional courses, probability theory and mathematical statistics mainly focus on mastering and applying professional course knowledge in process and outcome assessment, such as assessment of understanding of basic concepts, deriving theorems, and applying formulas. However, there is a lack of specific evaluation standards for the evaluation of ideological and political construction of courses. In the course assessment, students' ideological and political performance was not included in the evaluation system, resulting in students not paying attention to the participation of ideological and political education in the course.

3. Analysis of the ways and strategies for integrating ideological and political courses into probability theory and mathematical statistics course teaching

3.1 Clarify ideological and political goals of the course, lead ideological and politically, and coordinate morality and intelligence

Diversification of talent training goals has become an inevitable development of the times, but diversified talent training goals must be guided by correct values. Teaching and educating people are organically unified. Han Yu said that teachers teach and solve doubts. The teaching of probability theory and mathematical statistics courses is not only the inheritance of knowledge, but also the cultivation of talents. Therefore, the course must clarify the ideological and political goals, explore the ideological and political points of the course, and naturally integrate them into the course teaching, and ultimately achieve the goal of ideological and political guidance of the course and the coordinated cultivation of moral and intellectual talents.

3.2 Expand the ideological and political dimensions of courses and explore ideological and political ideas in various fields

(1) Mathematical thinking dimension

Mathematics disciplines have abstract, rigorous logical thinking and extensive application. Probability theory and mathematical statistics contain rich mathematical thinking. They can be analyzed from the mathematical thinking dimension in the exploration of ideological and political courses. For example, the discovery of the t distribution is Gasete, but why the rigorous logic of the t distribution is given by Fisher. The logical thinking of the two distributions can be explained through the connection between the t distribution and the F distribution, so that students can feel the charm of the rigorous logical thinking of the course, and can develop good scientific literacy in future learning.

(2) Mathematical Culture Dimension

Mathematical culture has a long history, and it has been reflected in mathematics since knotted and recorded events. Probability theory and mathematical statistics are important branches of mathematics, and also have a rich mathematical culture. Incorporating mathematical culture into the course teaching will not only allow students to learn professional knowledge well, but also feel the cultural charm of mathematics professional courses, and can also reflect the ideological and political content of the course through the integration of mathematical culture. For example, in

geometric probability models, it is necessary to unify weights and measures, which can be integrated into several mathematical crises and solutions to mathematical crises in the development of mathematics, allowing students to feel the charm of mathematical culture.

(3) Correct philosophical values

Behind the complicated things in the world, simple philosophical thinking is often hidden. In the course teaching of probability theory and mathematical statistics, course knowledge is imparted to students through course design, and philosophical thinking can be taught to students through some case analysis, so that students can not only learn professional knowledge but also establish a good world outlook and values. For example, in the explanation of Bayesian formula, we can establish the importance of integrity for students through the analysis of the story of Wolf coming, and let students establish correct values.

(4) Dimensional Educational Sentiment

Life is limited in length, but education can inherit your ideas and thinking. The establishment of many subjects, many courses, and many theories is not a matter of time. Only by adhering to the sentiment of education and using a heart of constant exploration can many theories be more perfect and better passed on knowledge. For example, for a long time, the distributions used in statistical analysis have been normal distributions. Normal distributions have many very good characteristics and are indeed widely used. Pearson also taught normal distributions to Gesset in statistical analysis, but Gesset finally discovered the t distribution through continuous research, opening a new era of small sample statistics. As Aristotle said, I love my teacher, but I love truth more. Education is a warm inheritance rather than a mechanical copy. This is the true educational sentiment, and it is also the case in the construction of other disciplines such as the median theorem system.

(5) Dimensional patriotism

Science has no borders, but scientists have their own motherland. Patriotism is the basic qualities of a qualified citizen. You can find some points in the course of probability theory and mathematical statistics to integrate patriotism. For example, in the principle of low-probability events, our army used ordinary guns to hit enemy aircraft in the War to Resist U.S. Aggression and Aid Korea. Although the probability of hitting a single gun is very low, it is basically an inevitable event that the enemy's aircraft will be shot down. Many such cases can be discovered. Through the explanation of such cases, not only the knowledge is explained, but also the patriotic sentiment is silently conveyed to students.

Of course, there are some other dimensions of mining, which can be continued in subsequent teaching design.

3.3 Break the limitations of a single teaching method

The new educational idea requires that teaching must be carried out with students as the center. Traditional probability theory and mathematical statistics teaching are presented mainly by teachers' teaching. No matter how wonderful you speak, students are prone to being tired of preaching. The teaching modes of courses should be diversified. A hybrid teaching model for online and offline teaching of probability theory and mathematical statistics courses has been introduced. Online teaching methods can be introduced. Some current affairs hot topics of courses can be designed to attract students' ideology, and then respond to these issues during offline teaching. After learning, students can look back at online courses, and often feel a sudden enlightenment. In the course teaching, you can also add a group discussion teaching method. Students may not be deeply impressed by what the teacher says directly, but through discussion, students exchange ideas and express their opinions, which often leads to deeper gains. The knowledge on paper is always shallow. Probability theory and mathematical statistics are a very strong subject. How to integrate

course ideological and political education into course practice is also a question worth thinking about. You can use some course experiments, such as the principle of low-probability events in hypothesis test, so that students can have a deeper understanding of the spirit of seeking truth and being pragmatic. Through the combination of multiple teaching methods, not only does the course teach colorfully, but also makes the courses more breakthroughs and points of integration into ideological and political education.

3.4 Improve teachers' general knowledge and literacy

Be a teacher with high academic knowledge and be a model with good health. Teachers should do a good job in ideological and political education in courses. It is not enough to just master the knowledge in their professional fields. Courses ideological and political education require a lot of knowledge in the fields of sociology, history, philosophy, etc., so professional teachers need to continuously improve their knowledge literacy through public education and training, self-learning and expansion, and teachers' communication. We should also pay more attention to current affairs and update the examples in the ideological and political case database in a timely manner. For example, in the mixed inspection of testing, the use of SARS cases is a bit outdated and should be updated to applications in the new crown epidemic. Courses on probability theory and mathematical statistics can teach good professional knowledge through the learning of the cutting-edge subject. Only by expanding general education and keeping up with current affairs can we teach good ideological and political courses.

3.5 Adjust the course syllabus and integrate ideological and political content

The construction of ideological and political education in probability theory and mathematical statistics courses cannot be just a matter of unintentional arrangement in classroom teaching. It is necessary to fundamentally establish the important position of ideological and political education in the course. In the formulation of the course syllabus of probability theory and mathematical statistics, it is necessary to formulate a section that reflects the ideological and political courses of courses, and fully integrate the ideological and political courses of courses into talent training plans, teaching syllabus, teaching design, curriculum goals, curriculum assessment, etc. Only by implanting the seeds of ideological and political education from the root of the course can the flowers of ideological and political education be bloomed in the course teaching.

4. Conclusions

After recent years of practical tests, the above-mentioned ideological and political construction methods of courses are very operational and reference-oriented, and play an important role in cultivating students' solid mathematical foundation, skills to adapt to society, and ability to innovate and expand, and have promotional value. Of course, the integration of ideological and political courses into professional basic courses is not a matter of success overnight. It is a process that requires continuous updates in combination with current affairs hot topics, and a process of continuous improvement in continuous practical exploration. Students' learning situation is constantly changing. Only by continuously improving the ideological and political construction of probability theory and mathematical statistics courses can good teaching results be achieved.

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