Research on Mathematical Modelling Course Based on Big Data Era

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Abstract: People are increasingly deepening their exploration of the world. In order to understand the world's interpretation of certain phenomena, people need to develop a subtle language to describe and then make the real world ideal. With the advent of mathematical modelling courses, people use it to answer difficult questions, and then the promotion of computer technology, so that mathematical modelling has certain knowledge and technology and science and technology. The advent of the information age has prompted people to accumulate a large amount of data information, which has led to changes in information patterns, and big data has been born.

1. Introduction

Based on the era of big data, the mathematical modelling course will undergo a change of the times. If the traditional teaching mode is used in the classroom, the knowledge will be separated from the development of the times. It is necessary to innovate and improve, and keep up with the times, in order to better adapt to the social needs of big data talent training.

2. Based on the requirements of mathematical modelling courses in the era of big data

Mathematical modelling is a set of complete mathematical frameworks constructed by mathematical tools for a certain purpose, combined with the laws of things, to achieve the purpose of collating, hypothesizing, abstracting, and simplifying the specified objects of the current world, so that people can analyze, control, anticipate the resolution quantitative results. The mathematical modelling process has certain manufacturability. The problem and the mathematical model are not merged together, and the mathematical model should be adjusted, modified, replaced and established in the original problem.

Model creation, solution and application are the core teaching contents of the mathematical modelling course in the traditional teaching mode. At the same time, the mathematical modelling course not only focuses on students' computing skills, scientific creation and innovative skills, self-solving mathematics knowledge and practical problem skills, teamwork skills, but also attaches great importance to the unique value of students. However, based on the era of big data, the mathematical modelling course has a new task, not only to shoulder the curriculum requirements in the traditional teaching mode, but also to combine with the development of the times to deal with new difficulties and problems. The requirements for the mathematical modelling course in the big

data era are as follows:

2.1. Problem actualization

The actualization of the problem is the most common problem in the teaching of traditional mathematical modelling courses, which requires the use of existing calculation methods and procedures to deal with such problems. The prevalence of the era of big data has promoted the reform process of modelling courses to a certain extent, requiring modelling courses to be close to daily life. Therefore, mathematical modelling courses must be based on the premise of social and economic development to cope with and answer questions.

2.2. Data sea quantification

At this stage, the social data is gradually rising. The mathematical modelling course pays attention to the digital data processing in the problem, and has the functions of data diversification processing, such as rationally exploring the value information in non-digital data such as images, music, video, etc., implement a full data processing problem model. In this regard, data collection, processing, modelling analysis, and feedback should be regarded as the key content of teaching in the mathematical modelling course.

2.3. Method novelty

Under the premise of attaching great importance to the intelligent development of big data, it is followed by complex and rare problems. Usually these problems are reflected in various disciplines and industries. The previous solution modes and algorithms are useless. Faced with this situation, mathematical modelling courses need to improve, improve and innovate problem solving methods. This has promoted the rapid development of new disciplines and new courses, thus providing a continuous source of motivation. In recent years, many schools have added the discipline of "data science and big data technology", indicating that more talents are cultivated for society under the premise of mathematical modelling.

2.4. Result value

Mathematical modelling courses have undergone a long development and are widely used in various universities. Its mathematical modelling course plays a key role in the process of talent skill training. Secondly, mathematical modelling has made great contributions in dealing with practical problems, and it has become a reference for mathematics, modelling and quantification. Based on the big data environment, the modelling course teaching should carry out the course teaching on the condition that the problem processing result is industrialized and marketed.

3. Research on mathematical modelling of traditional models

Models and programs are the focus of traditional mathematical modelling, focusing on three aspects: content research, method research, and results research. Traditional mathematical modelling pays great attention to the application of the model and the writing process. The main focus of the mathematical modelling course is on the familiar model and the applied model.

First, the role of innovation: mathematical modelling belongs to a theoretical course, so special attention should be paid to the issue of innovation. It can be applied to new fields while ensuring that existing methods and theoretical science are reasonable. It is also a mathematical thinking and

language specification. A practical problem method, using mathematical modelling, can broaden the thinking mode to a certain extent, look at the problem from different angles, think about the problem and solve the problem.

Second, the comprehensive role: the mathematical modelling process has a certain comprehensive subject characteristic, is also the process of teamwork, the actual problem to the direction of mathematical problems, and then use computer technology, algorithms to solve such problems; can also use written language Discourse method to solve, modelling problems cannot be separated from real life, often applied to practical problem solving. The actual problem will not be interfered by other factors. Mathematical modelling is mostly used to solve practical problems, and it has certain comprehensive characteristics.

Third, the role of bridges: bridge function is the third major feature of mathematical modelling, mainly reflected in the following four points: (1) in-depth analysis of the actual world and theory; (2) classroom development to scientific research; (3) close association Multi-scientific, complete cross-disciplinary applications; (4) promote non-professional researchers to positions of scientific research personnel. The real meaning of mathematical modelling exists is to use mathematical methods to construct a set of processes that discuss something in the real world. It is a process of abstracting real-world things, and it is also a process of creating an objective real-world standard. The mathematical modelling process includes: discovering problems - abstractions of things - solving problems, belonging to a scientific research process, but the time is shorter than that of scientific research, but scientific research needs to penetrate precision and caution into mathematical modelling. Differentiating the actual problem subject matter is based on the division of social division of labor, and distinguishes the problem that cannot be understood as a decomposition problem, requiring multiple disciplines to cooperate with each other. Modelling includes a large number of multidisciplinary resources, requiring further analysis of the problem and choosing the right contradiction of the problem is a prerequisite for weighing whether the researcher can become a good researcher.

In all areas of the world, mathematical modelling is used multiple times, where problems usually arise and where modelling is. Therefore, the mathematical modelling course plays an important role in the process of student growth and learning, and plays a decisive role.

4. Mathematical modelling analysis based on big data era

The definition of big data is very wide and has attracted wide attention from many scholars. According to the BIM technology big data concept can be divided into three categories: quantity, category, speed. PB and TB determine the capacity of data processing. With the advent of the era of big data, data has undergone significant changes in processing: (1) data collection represents the convergence of technology and business; (2) the tightness of big data technology and other fields is increasingly obvious; (3) Data privacy has attracted much attention; (4) Data exploration and technological innovation are the frontiers of today's social technology development; (5) Expanded the application platform of big data. Faced with this situation, several comments were made on the mathematical modelling course:

First, in the mathematical modelling course, the big data thinking logic is infiltrated, and thus the big data has undergone an era transformation. With the advent of the era of big data, bringing convenience to our lives and work, let us re-understand the world, the root of new inventions and services, and more transformations await us. The mathematical modelling thinking mode based on the era of big data is mainly reflected in the following points: 1 Focus on overall performance and control the overall situation. For the details of modelling data processing, the traditional data modelling method emphasized by the traditional modelling problem is to replace the whole data

with partial data, select sampling and other statistical methods, and pay attention to the regular exploration of partial sample replacement. It will make the information appear lost; big data modelling requires all the information to be used, and the full amount of data is used to complete the search, thereby improving the data fault tolerance rate. 2 focus on diversity characteristics. Tracing back to the small sample period, continuous audit processing is the main way of data collection, and data information must be accurate. Based on the era of big data, the characteristics of data diversity are relatively obvious, and some unstructured data have certain rationality and should be treated with emphasis. Not only to solve structural data but also to solve unstructured data. This is significant in the processing of modelling data and in the search for modelling tools, and will gradually be placed on unstructured data rather than structured data in mathematical modelling. 3 Emphasis on data equivalence. In the small sample era, weights are usually used to solve problems and focus on data value. For big data, the value of each data considered is treated equally. 4 Data source diversity and relevance. Small samples must be a unified area when reviewing data sources, while big data requires data to be in different areas, following a broad range of characteristics. Traditional modelling analyzes data in a certain area, and mathematical modelling in the era of big data emphasizes cohesion. Data connectivity that cannot be ignored when dealing with problems. On the other hand, data growth, data is updated in real time, and has a certain timeliness. There is a time to start and stop when exploring the law. Only the rule at the beginning and ending point of time is the correct rule, because things are changing.

Second, data processing under big data modelling. Data preprocessing is the focus of big data processing. In order to improve data quality, data preprocessing plays a decisive role in model assurance. Data processing must ensure the accuracy, integrity and uniformity of the data. Generally speaking, data must be exchanged, cleaned and integrated in the process of processing.

Third, let students understand the importance of big data modelling. The two methods of Teddy Cup Data Mining Contest Data and Tencent Data Mining Contest Data enable students to better understand big data and complete data operations with the help of teachers and feel the joy of data processing.

Fourth, the big data mining processing platform. To do one thing well, preparation is very important. Big data processing needs to start from the beginning. It is very difficult to use statistical methods or write algorithms by yourself. At present, there are many tools for processing big data on the network. The big data processing platform technology can be divided into five types: computer platform, data visualization platform, storage platform, integration platform, and analysis and mining platform.

The big data performance division of the needle includes online and offline. For example, Alibaba Cloud Data Processing Platform is a platform integrating integration and online, while the offline analysis platform is commonly used by SPSSModeler software. Understanding platform knowledge helps students to research more. As shown in Table 1, some big data mining processing platforms.

Table 1 Part of the big data mining processing platform

Name	Development Company	Application
Alibaba Cloud Big Data Platform	Alibaba Cloud	artificial intelligence, data analysis and application, big data basic services
Hadoop	Apache	big data distributed processing, distributed computing, unstructured data processing, distributed batch computing
Storm	Apache	online analytics, online learning, continuous computing, distributed RPC, ETL
SQLServer	Microsoft	structured data storage, ETL, report analysis, data display
SPSSModeler	IBM	data collection, statistical analysis, data mining

Fifth, model applicability is one of the key contents of the research in the era of big data. Traditional models are often reflected in the big data distributed processing platform, so it is necessary to continuously innovate and improve. From the perspective of the teacher, further analysis of the application of big data is a respect and obligation for scientific research.

Sixth, the extracurricular mathematics modelling competition and the mathematics modelling competition for college students were held. Strengthening students' modelling skills so that students can better participate in practical activities. The "Gaojiao Cup" mathematical modelling competition helps big data analysis and processing work, allowing students to apply what they have learned to real life and improve students' ability to handle problems.

Seventh, focus on cultivating students' self-learning ability and mastering new knowledge. Enriching their knowledge enables to develop their better and apply new knowledge to real life to achieve self-worth. Under normal circumstances, there are several ways to train students to learn independently: (1) Create a positive and cheerful classroom atmosphere to help students learn better. (2) After the content is explained, leave the students some time to study and digest the problems and knowledge, and learn to summarize and reflect. (3) Appropriate deployment of extracurricular knowledge after the completion of the class. (4) Know the differences between students, explore and discuss this issue, do not blindly judge the value of a student, and guide students to explore the desired answer.

5. Conclusion

In summary, the promotion of network information in recent years has driven the development of big data, and has also changed the teaching model of mathematical modelling courses. For this reform, according to the traditional mathematical modelling innovation and the bridge's own value, based on the data modelling in the mathematical modelling classroom under the era of big data, lead students to better understand the big data platform processing model, let students understand the importance of big data construction model, to develop students' ability to learn independently. In addition, in-depth study of algorithms and perfect models are the directions that all schools work together to explore.

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