

# *Discussion on the Reform of Ideological and Political Teaching in Major Courses of Big Data Management—Taking the Operations Research Course as an Example*

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**Abstract:** In 2023, we have entered the era of big data artificial intelligence, and the traditional business model has also ushered in new challenges. As an emerging discipline, big data major is particularly lacking in integrating ideological and political elements into the teaching of relevant courses. Operations Research has a wide range of applications in economic management, engineering technology, industrial and agricultural production, and other fields, and is the core basic course of big data management. Taking Operations Research as an example, this article analyzes the problems existing in the current teaching of Operations Research, further explores the ideological and political elements contained in the course of Operations Research, combines ideological and political education with curriculum theory teaching, and puts forward several innovative ideas. We hope it will be helpful for the ideological and political teaching of the current big data management courses and promote the cultivation of comprehensive talents in universities.

## 1. Introduction

With the rapid development of emerging technologies such as big data, cloud computing, blockchain, 5G, and the prosperity of the Internet e-commerce economy, digital technology and traditional industries are gradually integrating. In the face of the transformation of all walks of life to digitalization, many colleges and universities have gradually opened big data majors in recent years. As an emerging interdisciplinary major, the relevant teaching theory and practical application are different from traditional business majors, which is worth further exploration. Based on Operations Research, the basic course of big data application and management, this paper analyzes the problems existing in the current teaching of Operations Research, explores ideological and political elements, and combines ideological and political education with theoretical teaching. We hope to improve the ideological and political teaching content and teaching methods of big data professional courses, improve students' enthusiasm for learning, and further achieve the basic teaching goal of cultivating people with virtue in colleges and universities.

Operations research is a multidisciplinary professional basic course, known as the “decision module in the era of big data”. It is recognized that operations research originated from the research activities of some research groups established by the military departments of the United Kingdom, the United States, and other countries during World War II<sup>[1,2]</sup>. In recent years, as a data-based optimization tool and discipline, the course of operations research has received unprecedented widespread attention, and this course has been offered in all majors of applied disciplines such as business and engineering. The rapid development of emerging technologies such as big data, cloud computing, artificial intelligence, and sharing economy has enabled the traditional business model to move from physical stores to Internet e-commerce, integrating both online and offline development<sup>[3]</sup>.

As an important basic course in many professional courses of the university, there are still many problems in the teaching process of operations research. The current teaching content of operations research courses mainly focuses on optimizing the problems encountered in real life, lacks application in the fields of computers and artificial intelligence, and cannot reflect the characteristics of the era of big data and new business departments<sup>[4,5]</sup>. Based on the characteristics of big data management majors, this paper makes a preliminary discussion on the curriculum teaching mode and teaching methods of operations research and puts forward some suggestions in combination with ideological and political elements.

## **2. The current situation and existing problems of ideological and political teaching in operation research courses**

In recent years, under the background that the Ministry of Education has paid more and more attention to ideological and political education, teachers in universities have actively discussed the ideological and political education of operational research courses. For example, the literature<sup>[6,7]</sup> mainly focuses on the design of teaching objectives, integrates life values into the application of basic concepts, basic principles, and basic methods of operational research, and builds a “three-in-one” teaching goal system of knowledge acquisition, ability cultivation, and value shaping. Literature<sup>[8-12]</sup> aims at the reform of teaching content, digs deep into the ideological and political elements of the operation research course, condenses it into ideological and political cases, and integrates the cases into the teaching curriculum. Literature<sup>[13-16]</sup> puts forward a teaching method that integrates a variety of teaching methods in view of the single teaching method of operations research courses and the lack of students’ professional practical ability.

However, due to the strong theoretical nature of operation research courses, it is easy for college teachers to ignore ideological and political education in the teaching process. They pay more attention to the practicality of theory and application in teaching, but ignore the value elements behind theoretical practice. The limitation of class hours, coupled with students’ fear of mathematics, still have some urgent problems to be solved in the process of operation research teaching, mainly as follows.

### **2.1. Students do not have a deep understanding of the curriculum and do not have a comprehensive understanding of the use of learning operation research**

Operations research is a discipline that uses optimization theory and decision analysis methods to analyze practical problems and find the best solutions. The main use is to provide theoretical reference and decision-making suggestions for decision-makers from all walks of life in real life. In 1956, under the active promotion of Qian Xuesen, Xu Guozhi, and other older generations of operational researchers, China established the first operational research group<sup>[17, 18]</sup>. In 1958, Guan Meigu raised the issue of Chinese postmen named by international operations research textbooks,

which made China's operation research occupy a place in the field of international operation research. After years of development, China's operations research has made great progress and achievements, but it still has a big gap with the advanced research level of international operations research represented by Western countries. In particular, the current class hours of operation research are limited, and most of the teaching is at the theoretical level. It is difficult for students to understand, and it is even more difficult to understand the application of operational research in real life. College students in the new era in China should realize that learning operation research well is not only to solve practical problems but also to catch up with and surpass Western countries, which is the mission given to them by the times.

## **2.2. The teaching content is too theoretical and mathematical**

Case studies are less and outdated, and there is a lack of software solutions. Teaching cannot closely follow the characteristics of the development of big data and artificial intelligence. Operations research is a compulsory course of professional foundation that college students majoring in management must master. The course is very theoretical, and the derivation of many principles and methods requires a solid mathematical foundation, especially the theory of linear algebra. In the process of learning, in order to deepen the understanding of the optimization method of operations research, it is inevitable to learn the mathematical proof derivation behind the optimization method. Due to limited class hours, it is generally difficult for students to deduce a theory. If the teacher does not talk about theory and directly uses the optimization method to solve the problem, it will often cause students to know the operation research optimization method but not know the reason, which will lead to students' lack of mastery of the optimization method of operation research. In the current management majors in China, although operations research is a basic course of management, it often gives students the feeling that it is a mathematics course. Students feel that it is a purely theoretical subject. They can't recognize the application of operational research in management practice, and their practical ability cannot be improved.

## **2.3. The course assessment method is single**

At present, most universities mainly adopt the weighted assessment method of ordinary results and final examinations for the assessment of operations research courses. The usual grades include attendance, class performance, after-school homework, etc. The final examination is mainly a closed-book examination, focusing on students' mastery of the theoretical knowledge of the course. As mentioned above, due to the limitation of school hours, teachers' lectures in the classroom are mainly theoretical, and there is no time to explain the application of operational research in practice. When assessing the learning effect of this course, students' mastery can only be tested through paper scores. Relatively speaking, the current assessment method is relatively traditional and test-oriented. Like the theoretical course assessment method, it does not reflect the characteristics of management courses. There is a lack of assessment of the application of theory in practice, and there is also a lack of assessment of students' ability to use the optimization methods learned in operations research to solve practical problems, as well as the mastery of software applications.

## **3. Innovative ideas of ideological and political teaching in operations research courses**

In the era of big data and the background of new business science, it is of great significance to innovate in terms of teaching content, mode, and means, promote students' interest and motivation in learning, mobilize students' enthusiasm for learning, enhance students' practical learning ability, and help students establish correct personal views and values and be a qualified college student in

the new era of the 21st century.

### **3.1. Introduce ideological and political elements into classroom teaching to cultivate students' values**

Operations research originated during the Second World War. Many operation research masters experienced the hardships of war. But they did not compromise on the difficulties encountered in industrial and agricultural production after the war. They actively thought of ways to increase production, optimized the existing plans, and made outstanding contributions to the economic development of the world. Similarly, Chinese scholars have also formed a research team with Chinese characteristics in the field of operations research<sup>[19,20]</sup>. For example, during the outbreak of COVID-19 in 2020, it took China only 10 days to build two hospitals, Huoshenshan and Leishenshan, which were called China's miracles by Western countries. The rapid construction of these two hospitals is inseparable from the high attention and support of the state, which also reflects the idea of the builders applying the optimization knowledge of operations research to the extreme. During the construction period, how to allocate the tasks of each team, how to schedule the machinery and equipment, how to coordinate the progress of the construction period, etc., all need to apply the knowledge of operation research and related optimization tools. In classroom teaching, we should give more examples with positive energy in real life, combine theory with reality, and encourage students to learn Operations Research well and use the knowledge they have learned to serve the country and the people so as to be excellent college students in the new era. It can not only mobilize students' enthusiasm for learning operational research but also cultivate students' correct values and outlook on life.

### **3.2. Cases of artificial intelligence can be introduced and taught in combination with computer software**

Operations research is a basic and necessary course for mathematics, economic management, and engineering-related majors. Most of the cases selected in the textbooks have not been significantly changed for many years. Although these cases are classic, they lack the characteristics of the progress of the times. Especially they do not reflect the characteristics of the big data era. In practical teaching, it is recommended to introduce relevant practical cases for analysis according to the characteristics of each major, especially to find some operational research cases based on big data that reflect the characteristics of artificial intelligence and integrate ideological and political elements. For example, Li Shishi, a Korean Go nine-stage chess player, and Ke Jie, a Chinese Go nine-stage chess player, competed with AlphaGo, an artificial intelligence Go program developed by Google in 2016 and 2017. None of the results were better than Alpha Go. This is the famous Go man-machine war. The "Alpha Go" program has applied a lot of knowledge such as dynamic planning methods and decision trees in operations research. Such examples can be explained to students in the teaching process. While learning theoretical knowledge, students can also realize the application and importance of theoretical knowledge. At the same time, it can stimulate and mobilize students' enthusiasm for learning.

Due to the limitations of school hours, the teaching curriculum is recommended to appropriately pay less attention to theory, pay more attention to practice, and guide students to find cases in real life. For example, we can go to the supermarket to observe the passenger flow and the opening of the cashier at different times, or go to the bus station to count the departure interval of the bus and the number of passengers at different times, and then think about whether we can use the knowledge learned in operation research, such as queuing theory, to provide an optimized solution. Many allusions in ancient China contain operational research ideas, such as Sun Tzu's Art of War,

Tian Ji Horse Racing, Ding Wei Xiu Gong, Shen Kuo Yun Liang, etc. We should try to explore the ideological and political elements behind the theory and mobilize students' enthusiasm for learning.

### 3.3. Formulate a reasonable assessment plan

In addition to class attendance, homework, and final exams, practical activities in the daily learning process can be included in the assessment plan. Students are encouraged to complete their homework carefully. In the process of completing homework, students' ability to analyze and solve problems and abstract problems in practice into mathematical models can be cultivated. For example, the case analysis completed by students can be used as part of the assessment. The weight of the final examination can be appropriately reduced to uniformize the proportion of theoretical and practical assessment. At present, college students do not attach much importance to the usual theoretical study of many courses, and they can muddle through after a few days of sudden review before the exam. If we increase the assessment of the usual learning process, it can not only encourage students to study every class carefully but also really let students learn such a course, which will be of great benefit to their future work and life.

## 4. Conclusion

As an emerging discipline, related research has become a hot topic. However, in general, the research on integrating the ideological and political elements of the curriculum into the teaching of big data majors is particularly lacking. In particular, in view of the current situation of insufficient ideological and political understanding and limited ideological and political elements of big data management professional courses, it is urgent to further explore the ideological elements in big data professional courses, innovate the ideological and political teaching content and methods in big data professional courses, improve students' enthusiasm for learning, and further achieve the basic teaching goals of cultivating the young in colleges and universities.

Operations Research is mainly to model and optimize the solution of problems in real life. When dealing with practical problems, the optimization theory and ideas learned in the course can be used to guide students to establish a correct outlook on life. At the same time, the classic cases of the application of operations research ideas by the ancients in China can be quoted in the teaching course to stimulate students' national pride and enhance national self-confidence. The problems involved in the operation research course, such as linear programming, dynamic planning, game theory, and queuing theory, often occur in various fields of daily life. By learning operational research, mastering the scientific solutions to related problems, and introducing ideological and political elements, students can be prompted to use scientific theoretical tools to analyze and solve problems from the perspective of correct values in life, so as to find the essence of things.

This article summarizes the problems existing in the current operation research teaching and puts forward the idea of teaching innovation. The focus should be on further strengthening the cultivation of students' thinking and the exercise of students' practical abilities. Course innovation is a long-term process of accumulation and renewal. Universities should continue to explore teaching models that adapt to the environment of the new era and reflect the characteristics of the new era. Schools are supposed to appropriately increase the class hours of operation research and improve experimental facilities, so as to provide better conditions for the reform of operation research courses.

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