

Research on Ideological and Political Teaching Reform of “Shadow price” in Operations Research

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Abstract: The integration of professional courses and ideological and political elements is an important content of the current teaching reform in universities. Taking the shadow price section of operations research course as the research object, this paper carries out the ideological and political teaching reform. By combing and designing the ideological and political elements of multiple teaching links such as teaching objectives, teaching contents, teaching methods and ideas and teaching organization, a better teaching effect is achieved, students’ learning investment is effectively improved, and a better educational effect is finally achieved.

Keywords: Operations research; Shadow price; Curriculum thought and politics; Reform in education

Introduction

Integrating Ideological and political elements into professional curriculum education is one of the important aspects of higher education teaching reform in China. As the core course of management, Operational Research has the characteristics of strong practicality and rich connotation of optimization thinking. It is also a high-quality choice for ideological and political teaching reform. Shadow price is one of the main knowledge points of dual problems in Operational Research, and it is a further explanation of the optimal solution of dual problems. Shadow price effectively reflects the economic significance of duality and has strong practical application value. At the same time, it also coincides with economics, production management and other disciplines, which can well show the scientific practice value and enhance students’ interest. Therefore, taking the management specialty as the teaching object, I have reformed the teaching objectives, teaching contents, teaching methods and teaching organization of this section, in order to integrate the ideological and political elements into the whole process of the curriculum and achieve a better educational effect.

1. Analysis of teaching objectives

Students majoring in management are the main talents of future enterprise management. Besides mastering mature management decision-making methods, they also need to have good social responsibility, patriotism and management quality. Accordingly, the knowledge, capability and value objectives of this subsection are determined as follows:

Knowledge objective: Understand the definition of shadow price; Understand the economic significance of shadow prices; Understand the connotation of opportunity cost and marginal profit of shadow price; Understand the relation between shadow price, simplex method and duality; Master decision-making application of shadow price^[1].

Ability objective: Master the relationship between shadow price, market price and enterprise cost, and have the ability to apply shadow price to enterprise decision-making.

Value objective: To establish the philosophical thought of dialectical unity; Understand the practical value of science; Understand the influence of environment on decision-making, strengthen the sense of responsibility and patriotism; Strengthen discipline acceptance.

2. Ideological and political reform of teaching content of “shadow price”

The teaching content includes the main information and materials transmitted to students by the course, which plays a basic role in the realization of the course objectives. In order to strengthen the ideological and political gene in the teaching content, this paper rearrangement the knowledge points, teaching cases and curriculum problems in the shadow price section.

2.1 Analysis of Ideological and political elements in knowledge points

The main knowledge points of the shadow price section include: the definition of shadow price, the economic significance of shadow price, the connotation of shadow price and the decision-making application of shadow price. Among them, the ideological and political elements contained in each knowledge point are shown in Table 1:

Table 1 Ideological and political elements in key points of knowledge

Knowledge points	Ideological and political elements
Definition of shadow price	The multifaceted nature of things

Economic significance of shadow price	Philosophical thought of dialectical unity
Connotation of shadow price	Comprehensiveness and integration of disciplines
Decision making application of shadow price	Scientific nature of management and scientific practical value
Interpretation of test number and duality by shadow price	The preciseness of science, science is more than science

2.2 Curriculum Case Reform

Compared with the curriculum knowledge points, the curriculum cases are more specific and vivid, which is an important channel to help students understand the economic significance and scientific management behind the model, and mobilize their learning enthusiasm. Therefore, the course cases of each knowledge point are redesigned in this course. The details are as follows:

(1) Definition case of shadow price: Design the case of “The limit of Xiao Zhang and the bottom line of Xiao Li”, and consider the diversity and unity of decision-making through the opposite decision-making of the self-use and sale of Xiao Zhang’s enterprise resources;

(2) Economic significance cases of shadow price: Design simple and interesting cases of “Dormitory Apple trading”, “Apple trading on desert island”, “Apple trading on Apple island” and “Price and model of Huawei mobile phone” to help students understand the consistency between mathematical model and daily rules. Introduce the economic significance of opportunity cost and marginal profit, combined with the transaction difference between air and time, remind students to cherish time, cultivate the concept of the overall situation and establish the big picture concept.

(3) Decision cases of shadow price: Combined with current political hot spots, the price of Chinese chips, Huawei’s response strategies, the sales price of silk products under the epidemic, help students understand the allocation decision of enterprise resources, and strengthen their dialectical thinking ability and patriotism through the dynamic balance between shadow price and market price.

2.3 Curriculum problem chain design

Setting an appropriate problem environment in the teaching content can help students better construct their own knowledge system in communication, cooperation and exploration, and improve their learning ability. The chain of speculative questions in the “shadow price” section are as follows:

- (1) What is the optimal solution of the dual problem of optimal production planning?
- (2) How much is an apple in Southwest Petroleum University? How much is it on a desert island?
- (3) What is the difference between shadow price and market price?
- (4) How much can an apple sell on Apple island?
- (5) Looking at the complementary relaxation theorem through the shadow price, what do you think of?
- (6) How can an enterprise make a price decision for purchasing and selling resources?
- (7) How to understand the hot events of enterprises in recent years, such as the restriction of chips, the price of mobile phones and the price chaos under the epidemic?
- (8) In the free market, what is the final trend of shadow price and market price?
- (9) Are scarce resources available from within the enterprise?
- (10) Is there a cost to using your own resources?
- (11) Look at the inspection number with shadow price and think about the reasons for producing products?
- (12) Think about the cost of your own games and dramas? Allocate your energy and time reasonably.

3. Teaching methods and ideas

The teaching methods of this course are diverse and flexible, combined with online and offline channels, and comprehensively apply fun, situational, discussion, inquiry, and case-based methods. The main teaching methods and ideas are as follows:

(1) With Xiao Zhang and Xiao Li as the protagonists of the story, design the story of Apple transactions and device transactions. Through the role-playing by students, help students understand the definition and connotation of shadow price from vivid stories.

(2) Ingenious use of hot events such as epidemics and chips and actual corporate decisions for case teaching. The knowledge points are integrated into the realistic decision-making of contemporary enterprises and countries, and the knowledge transfer process is transformed into the empirical and speculative process of realistic decision-making, helping students understand the practical value of science. At the same time, through the epidemic and chips, the students’ national pride and sense of honor are enhanced, and the ideals and beliefs of serving the country are established.

(3) Knowledge construction based on the problem chain. Follow the law of students’ understanding, decompose the main points of knowledge into a problem chain, guide students to explore and construct the knowledge content of this class, understand the consistency of science and daily laws, and improve students’ thinking and research ability^[2].

(4) Group teaching activities. The overall arrangement and free choice are combined. The students are divided into large learning groups with 8 students in each group, and then the students in the group are freely combined into a mutual aid group of 2 to 3 people.

The team leader and group member's rights and responsibilities of each group are clearly defined. And, the mutual assistance and evaluation mechanism are established within the group, too.

4. Teaching organization reform

Teaching organization is a channel for ideological and political education throughout the curriculum. The course organization and corresponding ideological and political elements of the “shadow price” section are shown in Table 2.

Table 2 Ideological and political elements in curriculum organization

Classroom organization	Ideological and political elements
Course group	Enhance awareness of responsibility and cooperation, deepen emotional communication
Preparation before class	Ask the right questions and learn with questions
In-class teaching	Discipline awareness, speculative ability, and understanding of the practical value of science
Extension after class	Learn from the past, endless learning, dynamics and complexity of management

The specific teaching organization process is as follows:

(1) Before class: With the online teaching platform—Xuetang.com, a 10-minute video will be given to help students quickly understand the learning objectives of this lesson; Pre-class tasks: Review simplex method and duality properties. Sign in within the group before the class, and the group leader is responsible for supervising and summarizing the completion of the pre-class tasks with the students.

(2) In class: The course is guided by the trading story of Xiao Zhang and Xiao Li to help students understand the meaning of shadow price. By trading apples in a fun setting, students are inspired to deeply understand the relationship between price and environment; Through the connection among shadow price, simplex method, duality, classic economics viewpoints and production management methods, students' understanding of operations research have improved; Discuss the case of Chinese enterprises, understand the scientific nature of management, and strengthen students' patriotic spirit and sense of national honor; Teachers and students summarize and sort out the key knowledge points of shadow price. Finally, inspired by the shadow price, students were asked to think about their own costs and waste in time planning.

(3) After-class: Through the after-class discussion arranged by “Xuetang”, the students are asked to think about the shadow price in life and analyze the possible changes in the practical application of the optimal production plan. At the same time, analyze the shadow price of playing games, shopping on Taobao, brushing mobile phones, watching TV dramas, etc..

5. Analysis of teaching effect

Through the ideological and political reform of the “shadow price” section, the curriculum has achieved the following teaching effects:

Enhance students' interest in learning. Through the interesting cases and imaginative scenes in this class, the classroom atmosphere is extremely active. Students have a good grasp of knowledge.

Strengthened the students' patriotism to serve the country. With the in-depth understanding of price deviations under the epidemic, chip loss and Huawei's business practices, the students' management and practice capabilities have been improved, and the students' sense of national honor and willingness to serve the country have been strengthened.

Help students to clarify the connotation and value of this course. This course analyzes the connotation of opportunity cost and marginal profit of shadow value, re-understands the economic meaning of test number and duality, and discusses the relationship between shadow price and production decision. Help students understand the comprehensiveness and management practice value of operations research.

Improve the teacher's own quality. Educators are also educated. On the one hand, in the process of designing interesting teaching cases and sorting out the chain of knowledge problems, teachers' professional ability has been further improved. On the other hand, in order to achieve the teaching goals, teachers need to conduct extensive research about the prices of the epidemic, the pain of chips, and Huawei's mobile phone strategy, which can further improve their own literacy and strengthen their willingness to educate.

To sum up, through the reform of the ideological and political curriculum in the shadow price section, not only the students' learning investment has been increased, but also the ability of the teachers and students has been improved and finally achieved excellent educational effect.

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