



# Research on the Design of Ideological and Political Teaching System in Statistics Course Based on OBE Concept

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**Abstract.** OBE concept emphasizes student-centered, focusing on the achievement of learning results. This concept is highly consistent with the concept of ideological and political education of curriculum, which provides strong support for the realization of educational goals. This paper explores the design of ideological and political teaching system in statistics curriculum based on the OBE concept in the following three aspects: the curriculum objectives, the teaching content and the teaching effect evaluation scheme.

**Keywords:** OBE concept, curriculum thought and politics, statistics, teaching system design

## 1 Introduction

In his important speech in December 2016, General Secretary Xi Jinping emphasized the urgency and importance of deeply integrating ideological and political work into education and teaching. He particularly pointed out that it is necessary to continue to promote Marxist theory and build a solid and scientific worldview and an outlook on life and values for students, so as to lay a solid ideological foundation for their long-term development. Other courses should focus on one channel and cultivate their own responsibility fields, working in tandem with ideological and political theory courses to achieve synergy effects. In June 2020, the Ministry of Education issued the Guidelines for the Ideological and Political Development of Higher Education Curriculum. These guidelines emphasize that courses in economics and management should encourage students to engage deeply with social practice, focus on real-world issues, and cultivate professional qualities that enable them to benefit society through economic means. Furthermore, they advocate for serving the public with integrity while upholding ethical standards and legal principles. At a meeting of the Political Bureau of the CPC Central Committee held in August 2021, it was emphasized that the fundamental task of strengthening ideological and political work is to enhance moral standards and cultivate individuals. In light of this, professional courses at uni-

versities have been assigned a new mission: to integrate and elevate the cultivation of students' ideological and political competence within the teaching process, thereby promoting the development of students' overall quality.

OBE (outcome based education) is a new teaching paradigm. Its roots can be traced back to the wave of basic education innovation in the United States and Australia. This concept was first proposed by American scholars such as Spady in the 1990s, and it subverts the traditional teaching design ideas. By taking students' expected learning results as the starting point, teaching design is carried out in reverse. The core of the OBE concept is to place students in the center stage of education, and carry out teaching activities closely around their learning outcomes. At the same time, it upholds the core concept of continuous improvement and constantly optimizes the teaching process to ensure the achievement of educational goals.

Statistics is a core course in the higher education system of economic management, which is based on cultivating students' ability to collect data, organize data, analyze data with computer software and solve practical problems<sup>[1]</sup>. The course is comprehensive and application-oriented, which lays a foundation for subsequent professional course learning, participation in discipline competitions and graduation thesis writing.<sup>[2]</sup> Therefore, based on the reverse design principle of OBE concept, it is of great significance and value to explore the construction of the teaching system of Statistics course, including its educational objectives, ideological and political content, teaching process and method, and evaluation plan, to promote the improvement of the quality of ideological and political education in colleges and universities.

The ideological and political teaching of Statistics based on the OBE concept can be started from the following aspects: first, to set reasonable and clear teaching objectives; second, to build rich curriculum ideological and political teaching contents; third, to optimize the teaching process and teaching methods; fourth, to improve the evaluation plan of curriculum ideological and political teaching effect.

## **2 Determination of the Curriculum Objectives**

The OBE philosophy emphasizes results-oriented, which is the basis of this article. According to the professional personnel training plan and the job requirements of enterprises, combined with the discipline education requirements under the background of curriculum ideology and politics, the curriculum teaching objectives are determined according to the knowledge, skills, abilities and qualities that students need to master. The curriculum teaching objectives include three aspects: knowledge objectives, ability objectives and ideological and political objectives<sup>[3]</sup>.

### **2.1 Knowledge Objectives**

The knowledge objectives are as follows: to master the basic concepts of statistics, to be familiar with its development history, current situation and trend of statistics, to master the basic requirements and components of questionnaire design, to learn the common methods of sampling survey, to learn the generality of data, to master the

common methods of statistics, to master the principles of statistical inference using sample data, to be familiar with the basic principles of correlation analysis and simple linear regression analysis, to understand the basic concepts of time series, and to understand the concept of statistical index and compilation methods.

## **2.2 Ability Objectives**

The ability objectives are as follows: to design questionnaires according to questionnaire survey and questionnaire design requirements, to collect data reasonably according to questionnaire requirements, to use ECXCEL software and SPSS software for data cleaning and sorting, to use ECXCEL software and SPSS software for basic statistical description and analysis, to use ECXCEL software and SPSS software for statistical inference analysis and regression analysis, and to write the analysis results into a statistical analysis report.

## **2.3 Ideological and Political Objectives**

By studying this course, students can cultivate their thinking of rule of law, improve their professional ethics of statistics, strengthen their sense of social responsibility and core values, stimulate students' patriotic feelings and national pride, cultivate students' scientific spirit of seeking truth, improve their scientific thinking ability, and cultivate students' teamwork spirit.

# **3 Construction of Ideological and Political Content**

With the course goal is determined, it is necessary to construct the course ideological and political teaching content according to the knowledge goal, ability goal and ideological and political goal<sup>[4]</sup>. First of all, we will take the knowledge points of the "Statistics" course as the carrier, excavating the hidden ideological and political elements according to the source and development, content and principle, function and significance of each knowledge point; Secondly, case teaching is an important part of statistics classroom teaching and an important opportunity to integrate ideological and political elements. We will select cases that can reflect ideological and political themes such as feelings of family and country, social responsibility, and core values. Thirdly, we will focus on cultivating students' rigorous academic attitude and scientific spirit of truth-seeking by proper design of exercises in class, as well as collecting and analyzing data after class. These exercises should center on actual social and economic problems and solutions. Finally, we will combine the ideological and political elements and cases of the course with the teaching content, which will also be reflected in the teaching resources such as the teaching syllabus, teaching plans, multimedia courseware, and so on. The connotation of the ideological and political elements of the course is strengthened to ensure that the ideological and political elements naturally "flow" in the classroom teaching process. To this end, according to the statistical work flow, the three modules of statistical investigation, statistical sort-

ing and statistical analysis are divided. In addition, the introduction part of the course is preceded, and the curriculum ideological and political teaching content is established with the modules and their corresponding knowledge points<sup>[5]</sup>.

### 3.1 Introduction to Statistics

#### (1) Conciusness of the Country

When teaching the history of the development of statistics, it focuses on introducing the evolution of Chinese statistics in chronological order. Ancient China had already started to use statistical methods to record population, land and agricultural production, which laid the foundation of statistics. With the introduction of modern scientific methods, statistics in China gradually formed a professional system and methodology, and made important contributions to the fields of government statistics, social surveys, economic analysis and population statistics. After the founding of the People's Republic of China, statistics developed more systematically and scientifically, playing an indispensable role in national governance and policy making. In recent years, with the rapid development of big data, artificial intelligence and other technologies, statistics has played a new role in data processing, model building and decision support. Through the study of the history of statistics development in our country, students' interest in learning can be improved and their patriotic enthusiasm stimulated.

#### (2) Pride for the Country

We can introduce the famous statistics allusions in ancient China, such as roping, deed counting, counting, water conservancy statistics in the Northern Song Dynasty and financial statistics in the Qing Dynasty during teaching, so that students can feel the statistical wisdom of ancient Chinese people through allusions, show the germination and application of statistical ideas in China, and enhance students' national pride and self-confidence.

#### (3) Scientific Spirit

This paper introduces the outstanding contributions of famous Chinese statisticians such as Xu Baoð «~ §, Wu Dingliang, Dai Shiguang, etc., so that students can have a deep understanding of the scientific spirit of statisticians' perseverance and constant pursuit of truth, as well as their craftsman spirit of taking root in the foundation and striving for excellence, so as to guide students to develop a rigorous attitude towards research and inspire their exploration

### 3.2 Part of Statistical Survey

#### (1) Statistical Professional Ethics

Statistical investigation is the beginning of statistical work. Statistical investigation is not only a means to collect data, but also a bridge connecting theory and practice, and the basis for obtaining, analyzing and interpreting data in statistical work.

#### (2)Team Work Spirit

The process of statistical investigation involves many links and usually requires a lot of time and resources, including human, material and technical support. Therefore,

teamwork is the key factor to ensure the successful completion of statistical investigation. In the process of statistical investigation, students will achieve the common growth of team members through the establishment of clear team objectives and role division, the establishment of open and effective communication channels, the cultivation of trust and cooperation spirit between the team.

### (3) Sense of Social Responsibility

After class students will be encouraged to choose topics related to social development, public policies or social issues to carry out group investigations, such as targeted poverty alleviation, rural revitalization, economic development, environmental protection and allocation of medical and educational resources, etc. We will also guide students to pay attention to social and livelihood issues, enhance their social responsibility and problem-solving ability, promote students' all-round development.

## 3.3 Part of Statistical Collation

### (1) Social Responsibility

Statistical sorting is an important part of data analysis, which mainly includes screening, classifying and summarizing the collected data, and selecting appropriate charts for display and preservation. At the stage of statistical sorting, the privacy and fairness of data should be emphasized. Data privacy can be protected through data encryption, anonymisation processing and strict access control, ensuring that personal information will not be leaked or misused. Fairness is reflected in avoiding data bias and inequality, such as ensuring the representative sample and avoiding the introduction of bias due to improper data collection or processing. Through these measures, ethical standards for data use can be maintained, the reliability and fairness of analysis results can be enhanced, and students can understand the social responsibility embedded in statistics.

### (2) Core Values

The quality of statistical data is the key to statistical work. Without real and reliable statistical data, it is impossible to have accurate predictions. Therefore, we should be rigorous and truth-seeking when collecting and sorting out data to ensure the authenticity and accuracy of statistical data. When teaching data collection and collation, it can be combined with cases to teach the hazards of statistical information distortion, emphasize the authenticity of statistical data, ensure the quality of data, guide students in the process of learning, life and behavior to be realistic, honest and trustworthy, and to cultivate students' social core values.

## 3.4 Part of Statistical Analysis

### (1) Consciousness of the Country

In the time series analysis, the time series data of China's economic development in the past few decades are analyzed to show the achievements of national economic growth and feel the progress of national economy; we will make research on the time series data of poverty alleviation projects to show the changes in the poverty rate under the national targeted poverty alleviation policy and feel the country's efforts in

improving people's livelihood; we'll analyze the data of COVID-19 epidemic to show the measures and effectiveness of the country in epidemic prevention and control, and to cultivate students' trust in the national public health system; We'll also study the environmental data before and after the implementation of the national environmental protection policy, show the progress and achievements of the country in environmental protection, and stimulate students' environmental awareness and sense of responsibility for the country.

### (2) Scientific Thinking

In statistical inference, in order to analyze the authenticity of socio-economic events, the method of statistical inference can be used to evaluate the reliability of information, test the authenticity of data, and to explain cases that enable students to learn how to apply statistical methods to analyzing data and identifying anomalies in data, so as to enhance students' courage to reject the false and find the truth and their ability to think independently. We'll enhance students' critical thinking ability and cultivate the scientific spirit of truth-seeking exploration.

### (3) Social Responsibility

In correlation and regression analysis, students can be guided to pay attention to the current situation and future direction of rural economic development by analyzing the relationship between rural residents' income and consumption expenditure; Study the effect of poverty alleviation policies on improving the living standards of residents in poor areas and promoting regional economic development, reflecting the country's commitment to eliminating poverty and realizing social equity; To discuss the impact of the distribution of educational resources (such as teachers, facilities, etc.) on the development of students, and consider how to promote the rational distribution of educational resources and promote the balanced development of education; To study the impact of environmental pollution (such as air quality) on residents' health, focusing on how to reduce pollution and promote sustainable development; Through the analysis of these practical cases, students are guided to understand the social issues behind the statistics and develop their sense of social responsibility and sensitivity to public policies.

## 4 Optimization of the Teaching Process and Methods

OBE concept emphasizes student-centered and results-oriented reverse design. Therefore, the teaching process of Statistics course based on OBE concept adopts reverse design idea, and all teaching links are results-oriented and student-centered. Specifically, it includes "teachers publish tasks -- students' independent learning -- teachers' supplementary teaching -- students' enrichment and improvement -- teachers' summary comments -- continuous feedback and improvement", and the whole process runs through ideological and political education<sup>[6]</sup>.

For example, when explaining correlation and regression analysis, teaching resources and learning tasks are released on the learning platform in advance, so that students can understand the concepts of correlation analysis and regression analysis through pre-class learning, draw a mind map of correlation analysis and regression

analysis, and clarify the relationship between the two. In class teaching, teachers mainly explain the realization methods of correlation analysis and regression analysis by combining teaching materials and actual cases, and use software to demonstrate cases, and then assign classroom tasks to analyze the relationship between rural residents' income and consumption expenditure. Students use software to conduct correlation analysis and regression analysis according to the case data provided by teachers, and teachers always pay attention to students' completion. Teachers can give timely guidance to students. After the students finish the class tasks, the teacher will make comments according to the students' completion, supplement and summarize the existing problems and areas for improvement, and optimize and adjust the mind map drawn by the students. Assign tasks after class. Take Xi'an City as an example, we can consult relevant literature and data, study the impact of environmental pollution on residents' health, use regression analysis to study the relationship between environmental pollution level and health problems, and propose specific policy suggestions or measures to reduce pollution according to data analysis and case study results. Finally, literature review, data analysis, case studies and policy measures were integrated into a comprehensive report, which guided students to pay attention to social and livelihood issues through case analysis and enhanced students' sense of social responsibility.

In terms of teaching methods, the OBE concept emphasizes the final learning effect. Therefore, the selection of teaching methods of Statistics based on the OBE concept should highlight the central position of students and pay attention to students' participation. In the teaching process, combining the ideological and political themes and objectives, student-centered teaching methods such as case teaching method, situational teaching method, problem-oriented method, task-driven method and flipped classroom method are adopted to stimulate students' enthusiasm and initiative in learning, improving the teaching effect and enhancing the educational function of the course.

For example, when the ideological and political elements such as national feelings, national pride, scientific spirit and social responsibility are integrated into the teaching of Statistics, they can be realized through case teaching and situational teaching methods. Through practical cases and situational simulation, students can experience the application value of statistics in practical problems. And in the process of cultivating students' feelings of family and country, national pride, scientific spirit and social responsibility. For another example, when integrating statistical professional ethics, core values, scientific thinking and other ideological and political elements into the teaching of Statistics, problem-oriented and task-driven methods can be adopted to achieve this goal. Through practical problems, students can be guided to discuss the statistical professional ethics to be observed in the process of statistical investigation. Guide students to analyze the conflicts of core values encountered in the process of statistics collation through task-driven analysis, shape students' statistical professional ethics and cultivate students' core values in the process of discussion and analysis. The ideological and political elements of teamwork spirit can be integrated into classroom teaching through flipped classroom teaching method, and statistical survey work can be completed in the form of a team. First, the goal of the statisti-

tical survey project is clearly defined, and the task is assigned to each team. Then, each team designs a questionnaire or survey plan, and organizes team members to cooperate with each other for data collection. The team members work together to sort out and display the data. Finally, each team can explain the survey process and display the survey results in the form of flipped classroom, while other team members make suggestions for improvement and teachers make comments and summaries. The flipped classroom teaching method can not only effectively cultivate students' statistical survey skills, but also strengthen ideological and political education in the practice of teamwork. And cultivate students' teamwork spirit.

## 5 Evaluation Plan of Ideological and Political Teaching Effect

Based on the OBE concept, the "Statistics" course ideological and political teaching effect evaluation reflects the classroom teaching effect with students' learning results. Therefore, we will improve the combination of subjective and objective process evaluation measures, including class performance, project team practice work, individual work, in-class test, mid-term test, software operation report, etc. At the same time, we will combine teacher evaluation, student self-evaluation, student mutual evaluation and other diversified evaluation methods together, as well as the whole process of the evaluation of curriculum ideological and political teaching. What's more, the final examination is carried out in the form of closed-book examination, and the ideological and political elements are integrated into the examination questions. Through the combination of process assessment and final assessment, the evaluation system of ideological and political teaching effect of Statistics course is constructed in an all-round and multi-angle. The specific evaluation standards are shown in Table 1.

**Table 1.** Evaluation Plan of Ideological and Political Teaching Effect of Statistics Course

Assessment Link	Evaluation Methods	Ideological and Political Goals	Evaluation Subject	Weights
Procedural Assessment	Classroom Performance	Professional Identity	Teachers	8%
	Team Project Practice Assignments	Statistics Work Ethic, Teamwork Spirit, Social Responsibility, National Pride		16%
	Individual Assignments	Scientific Spirit, Scientific Thinking, Social Responsibility, Core Values		9%
	Classroom Test			6%
	Midterm Test			8%
	Software Operation Report	National feelings, core values, scientific thinking		8%
Final Assessment	Final Exams	Scientific Spirit, Scientific Thinking, Social Responsibility, Feelings of Family and Country	30%	
	Questionnaire (Teacher Edition)	All Ideological and Political Objectives	5%	



	Questionnaire (self-rated version)	All Ideological and Political Objectives	Student Self-assessment	5%
	Questionnaire (mutual assessment version)	All Ideological and Political Objectives	Mutual Evaluation within Class	5%

## 6 Conclusion

The OBE concept emphasizes student-centered and results-oriented, which complements the concept of ideological, political and moral education, and jointly promotes the realization of curriculum education goals. The ideological and political teaching system of Statistics course based on OBE concept includes a closed-loop process of "determining course objectives - constructing ideological and political content - optimizing teaching process and methods - perfecting evaluation scheme". Through continuous cyclic classroom teaching and feedback improvement, the realization degree of knowledge objectives, ability objectives and ideological and political objectives of Statistics course is gradually improved. Gradually, we will realize the organic integration of professional knowledge, application ability and ideological and political education, which not only helps to cultivate students' solid professional knowledge of statistics and high application and practical ability, but also guides students to have a deep understanding of socialist core values and excellent Chinese culture. It will enhance students' feelings of home and country and national pride, cultivate their excellent statistical professional ethics and social responsibility, cultivate the scientific spirit and scientific thinking of seeking truth, stimulate the sense of teamwork among students, and build high-quality statistical professionals.

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## References

1. LIU Meifen, Exploration on Teaching Reform of Statistics from the perspective of curriculum Thought and Politics [J]. Science and Technology Information,2021.07:154-156,160.
2. ZHANG Xinwen, Ma Minna, Yang Liu, Research on the Path of Ideological and Political Construction of Statistics Course in Finance and Economics Colleges [J]. Modern Commerce and Industry,2022.18:215-216.
3. Xie Man, Kang Wanjie, Design of Ideological and Political teaching System of "Warehousing and Distribution Management" course based on OBE concept [J]. Science and Education Literature Exchange, 2024.07:81-86.
4. Jin Chun, Research and Practice of Statistics Classroom Teaching based on OBE concept [J]. Foreign Trade, 2022.08:139-141,147.

5. Zhang Yan-Qin, Tian Xin-Cui, Wang Fei, An empirical study on the reverse teaching reform of statistics course from the perspective of OBE -- A case study of Taiyuan University of Science and Technology [J]. *University Education*, 2023.10:56-58,65.
6. Wu Qing-Qing, Wang Wei, Wang Zhen, Research on statistics "OBE + paired classroom" teaching model under curriculum ideological and political concepts [J]. *Modern Commerce Industry*, 2022.12:160-16.

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