

The Concepts, Practical Approaches, and Evaluation of Effectiveness for Integrating Ideological and Political Education into the "Application of Business Data Statistical Analysis" Course

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Abstract: Existing statistical textbooks and online courses primarily focus on the introduction of techniques and methods, often lacking engaging and diverse educational materials, which can lead to a somewhat monotonous learning experience for students. In response to this issue, this article seeks to define the ideological and political education concepts and objectives of the "Application of Business Data Statistical Analysis" course within the auditing discipline from four perspectives: the leadership of the Communist Party, the guidelines issued by the Ministry of Education's National Standards, industry development trends, and the specific goals of professional training. The article then further refines the teaching objectives of the course alongside the ideological and political education goals. It subsequently offers strategies and measures for incorporating ideological and political education into the course content, as well as establishing a framework for evaluating the effectiveness of this integration. The aim is to provide constructive recommendations for improving the quality and standards of ideological and political education within statistical analysis software courses in higher education institutions.

Keywords: Application of Statistical Analysis; Ideological and Political Education in Curriculum; Concept of Development; Practical Approaches; Evaluation of Effectiveness

In May 2020, the Ministry of Education issued the "Guidelines for the Construction of Ideological and Political Education in Higher Education Curricula," emphasizing the need to

enhance the integration of ideological and political education within the curriculum in order to establish a high-level talent training system and resolve the issue of disconnection between professional education and ideological education. This article first clarifies the ideological concepts and objectives of the course through four dimensions: the leadership of the Communist Party, the guidelines issued by the Ministry of Education's National Standards, industry development trends, and the specific goals of professional training. It then elaborates on the specific teaching objectives and ideological education goals for the course. Additionally, the article presents strategies and measures for integrating ideological and political education within the curriculum based on the course content, and seeks to establish an evaluation framework for assessing the effectiveness of this integration.

1. Concepts for Integrating Ideological and Political Education into the "Application of Business Data Statistical Analysis" Course

The course "Application of Statistical Analysis in Business Data," part of the auditing major, is an interdisciplinary curriculum that integrates economics, mathematics, and statistics, focusing on the quantitative analysis and prediction of economic phenomena. The course systematically covers fundamental methods such as regression analysis and time series analysis, and includes practical exercises using Stata software to enhance students' capabilities in applying statistical tools to real-world economic issues. It also aims to cultivate rigorous logical thinking and research skills, thereby establishing a strong foundation for developing "research-oriented auditing professionals." The curriculum is comprised of ten sections: an overview of econometric

methods for causal inference, linear regression, standard error, treatment effects, matching methods, panel data analysis, the difference-in-differences method, instrumental variables, self-selection models, and regression discontinuity. Prerequisite courses include "Principles of Economics," "Probability Theory and Mathematical Statistics," and "Statistics," among others.

Many current statistics textbooks and online courses primarily introduce techniques and methods, often lacking emotional engagement and diverse educational materials, which can render the learning experience somewhat dull. To tackle this issue, we intend to combine elements of statistics, econometrics, Stata software operations (covering essential processes such as data collection, modeling, analysis, prediction, and decision-making), the training objectives of the auditing major (particularly competencies in data analysis and smart technologies), and the ideological education components of business curricula (emphasizing scientific spirit, innovation, social responsibility, data craftsmanship, and integrity, while integrating Marxist methodology, Mao Zedong's practice theory, and Xi Jinping's thoughts). This holistic approach aims to define the ideological and educational philosophy and goals of the course. By reconstructing the ideological education framework within the curriculum, we seek to enrich the teaching content, enhance students' knowledge absorption and application, and promote the achievement of both professional and ideological educational objectives, thereby supporting students' overall development.

1.1 The Ideological Guidance of the Party

The 20th National Congress of the Communist Party emphasized that in the era of information-based auditing, research-oriented auditing is essential for fulfilling the auditing responsibilities of the new era and is crucial for enhancing the quality and efficiency of auditing practices. In 2022, Auditor General Hou Kai remarked that deepening research-oriented auditing is vital for achieving high-quality development in the auditing field. Furthermore, the "14th Five-Year" National Audit Work Development Plan highlights the need to innovate auditing concepts and actively implement research-oriented auditing. Consequently, it is important to cultivate a

research-oriented auditing mindset among students. Auditing professionals must thoroughly understand the worldview and methodology outlined in Xi Jinping's Thought on Socialism with Chinese Characteristics for a New Era, and effectively apply the relevant Marxist perspectives and methods. This understanding should be transformed into practical outcomes that enhance the quality and efficiency of auditing work. Building upon this foundation, we aim to integrate the characteristics of the course to further develop students' research-oriented auditing mindset into the application of research-oriented auditing tools and the presentation of research-oriented auditing outcomes.

1.2 The Guidelines Issued by the Ministry of Education's National Standards

According to the "National Standards for Teaching Quality" established by the Ministry of Education, the primary mission of higher education is to cultivate senior professionals endowed with a sense of social responsibility, innovative spirit, and practical skills. The two foundational dimensions of business administration education in higher institutions are the pursuit of truth and the pursuit of goodness. The pursuit of truth involves uncovering the true nature of management practices in the objective world, primarily inquiring into "what it is." Conversely, the pursuit of goodness emphasizes the consideration and reflection on how management practices impact human society, primarily questioning "how it is" and "how it ought to be." The pursuit of truth manifests as a spirit of scientific exploration, while the pursuit of goodness reflects a spirit of humanistic reflection. Additionally, the accounting specialization requires fundamental training in modern auditing methods and skills, enabling students to possess the essential abilities to identify, analyze, and resolve auditing issues, thus preparing them as innovative, versatile, and application-oriented professionals in the field of auditing.

1.3 Industry Development Trends

Advancing research-oriented auditing practices requires an effective understanding of the new tasks in auditing for the new era. In line with industry development, two critical components of research-based auditing education are "new

quality productivity" and the incorporation of "data assets on the balance sheet." By attentively observing industry trends, we integrate these two key elements into our curriculum, closely aligning them with the cultivation of data craftsmanship and data integrity literacy. This approach ensures that the teaching content is not only relevant to current practices but also forward-looking and practical.

1.4 The Specific Goals of Professional Training

Nanjing Audit University's auditing major (internal auditing focus) is designed to meet the significant demand for higher education in auditing to support the development of the party and the state. By integrating interdisciplinary fields such as "Auditing," "Computer Science and Technology," and "Statistics," this program aims to cultivate "Chief Audit Officers" and "Chief Risk Officers" with a strong foundation in big data auditing technologies and a comprehensive understanding of international internal auditing practices. Specifically, it seeks to adapt to the organizational innovation needs of the era of digital intelligence. Graduates will be equipped with robust research and innovation abilities, sound professional judgment in auditing, and critical thinking, alongside data analysis and intelligent technology skills. These competencies will prepare them to effectively engage in internal auditing and risk management practices, positioning them as high-level international application-oriented professionals dedicated to supporting the governance of global organizations.

2. Construction Goals

In accordance with the spirit of the 20th National Congress of the Communist Party and the National Standards document from the Ministry of Education, alongside current industry development trends, we will outline course teaching objectives focused on four key aspects: understanding, cultivation, shaping, and knowledge transfer abilities. Additionally, taking into account the characteristics of the course, we will establish ideological and political education goals along four dimensions: guidance, cultivation, shaping, and practical application.

2.1 Course Teaching Objectives

2.1.1 Students will understand the basic principles and methods of business data statistical analysis

Students will learn fundamental concepts of business data statistics, including linear regression, standard error, treatment effects, and econometric methods for causal inference. This will enable them to comprehend data collection and processing methods as well as data modeling approaches.

2.1.2 Students will develop the ability to analyze business data statistically

The course will cover foundational theories and techniques of business data statistics, including matching methods, panel data, difference-in-differences, instrumental variables, sample selection models, and regression discontinuity designs. Students will master quantitative analysis techniques and apply these skills to establish risk warning models and audit decision-making models using Stata software.

2.1.3 Students will cultivate a "research-oriented auditing" mindset

Guidance will be provided for students to utilize business data statistical theories and methods to analyze current auditing issues. They will gain proficiency in using Stata software for obtaining audit evidence, constructing audit decision models, and conducting data analysis. Students will be adept at employing Stata to complete data-related tasks in the auditing process and to effectively carry out big data audit analyses based on various business contexts.

2.1.4 Students will achieve knowledge transfer and develop the design, operation, and presentation skills for "research-oriented auditing"

Using diverse methods, such as hands-on training in on-campus computer labs, project-based experiments, supervised faculty research projects, competitions like the "Challenge Cup" and "Internet Plus," innovation initiatives, and off-campus survey reports, students will learn to proficiently use software for data statistical analysis. This will facilitate the transfer of their knowledge of business data statistics to auditing big data analysis, expanding their "research-oriented auditing" mindset into practical tool applications and showcase results.

2.2 Ideological and Political Education Goals

2.2.1 Students will internalize the spirit of science and enhance social responsibility

An important role of data statistical analysis is to "distinguish truth from falsehood," identifying the essential causal relationships between phenomena. By using typical cases and short video reenactments (such as the significant contribution of big data predictions to epidemic control during the COVID-19 pandemic), students will grasp the value of data statistical analysis, igniting their desire to explore and pursue the truth, while fostering a scientific spirit that encourages the discovery and application of scientific laws. Students will be educated to objectively recognize the external environment of the auditing profession's development and accurately understand the new tasks of auditing work in the new era. For example, through concepts like "new qualitative productivity" and "data assets on the balance sheet," students will comprehend the necessity of "research-oriented auditing," thus cultivating a sense of historical mission and social responsibility in their auditing careers.

2.2.2 Students will uphold the craftsmanship spirit of data and cultivate data integrity

The authenticity, accuracy, timeliness, and reliability of data depend on a spirit of craftsmanship. By engaging in experiments and practical exercises, students will experience diligence and perseverance in the collection, mining, and analysis of business data, emphasizing that only precise data can be disclosed and reported effectively. Data integrity is both an attitude and a measure of professional competency; serious consequences arise from data manipulation, financial fraud, and auditing misconduct. Short video reenactments and lectures will be utilized to foster students' data integrity, helping them appreciate the necessity of objectivity and fairness in data collection, mining, and analysis.

2.2.3 Students will gradually develop an innovative spirit akin to that of "Chief Audit Officers" and "Chief Risk Officers"

Through project-based experiments, competitions like the "Challenge Cup," "Internet Plus," and innovation projects,

students will engage in multiple scenarios of data collection, mining, and analysis, fostering independent thinking, problem analysis, information evaluation, and decision-making skills. In their practical explorations, students should avoid blindly adopting Western data and models, learning instead to adapt to the Chinese context in their search for new natural experiments, instrumental variables, and more, thereby honing critical thinking and an innovative spirit.

2.2.4 Students will practice Marxist methodology, Mao Zedong's practice theory, and Xi Jinping's thoughts

In the data collection process, students will be guided to implement the principle that "no investigation, no right to speak," appreciating the steps, stages, and laws of understanding phenomena. During big data analyses, they will learn to "distinguish truth from falsehood," and to regard "practice as the sole criterion for testing truth." When applying conclusions from data analysis, students will practice linking theory with practice, offering policy suggestions grounded in China's national conditions, thereby fulfilling the role of a think tank for "research-oriented auditing."

3. Course Construction Ideas and Initiatives

The course group will develop aligned ideological and political education (IPE) content for each chapter's specific topics, creating a mapping correlation matrix that links IPE elements to professional knowledge. Furthermore, it will specify the IPE components incorporated in each knowledge point. To facilitate the learning of IPE materials, the group will utilize various methods such as lectures, case studies, videos, discussions, debates, and project-based experiments. This approach aims to foster students' scientific spirit and sense of social responsibility while cultivating data craftsmanship and integrity. It also seeks to shape the innovative spirit of the roles of Chief Audit Officer and Chief Risk Officer and implement Marxist methodology, Mao Zedong's theory of practice, and Xi Jinping's thoughts. The details are presented in Table 1.

4. Expected Educational Outcomes and Assessment of Curriculum Development

In order to comprehensively evaluate the

effectiveness of the integration of ideological and political education in the curriculum, we have meticulously developed an assessment and evaluation framework that aligns with the university's teaching evaluation system and student development model. This framework encompasses four primary indicators:

effectiveness of teaching assessments, improvement in student learning experiences, application of data analysis tools, and enhancement of student research capabilities and achievements, along with twelve specific secondary indicators.

Table 1. Association Mapping of Ideological and Political Education (IPE) in the Course on Business Data Statistical Analysis Applications Utilizing Stata

Key Teaching Points	Integration of Ideological and Political Concepts and Points of Connection	Teaching Formats and Methods
Chapter 1: Overview of Common Econometric Methods for Causal Inference	The Role of Scientific Methodology in Data Analysis; Simpson's Paradox and the Epistemology of Understanding	Classroom Instruction, Documentary Appreciation, and Flipped Classroom Approaches
Chapter 2: Regression Analysis	Changes in auditing data highlight the necessity for "research-oriented auditing" and emphasize the social responsibility of auditors	Lecture Reports and Organized Discussions
Chapter 3: Linear Regression	The validity of conclusions drawn from linear regression depends on the data being authentic and reliable	Classroom Instruction, Short Videos, Moderated Debates, and Organized Discussions
Chapter 4: Standard Error	Handling Standard Errors and a Scientific Rigor; Reducing Errors in Auditing Data	Short Videos and Organized Discussions
Chapters 5-8: Disposition Effect, Matching Method, Panel Data Analysis Method	Big Data Prediction and Epidemic Prevention: An Analysis through the Lens of Dialectical Materialism as Articulated by Xi Jinping	Web-based Scenario Reenactment, Teacher Feedback for Improvement, Project-based Experiments, and Classroom Instruction
Chapters 9-12: Difference-in-Differences Method, Instrumental Variables, Sample Self-Selection Model, Regression Discontinuity	Cultivating Research-Oriented Auditing Skills: Exploring Natural Experiments and Instrumental Variables within the Chinese Context; Implementing the Principle of "Theory into Practice" in Data Analysis Applications	Classroom Instruction, Literature Review, and Project-Based Experiment

Firstly, with respect to improving the effectiveness of teaching assessments, the project has optimized teaching methods, resulting in remarkable performance in both student evaluations and peer reviews. This improvement directly signifies a rise in teaching quality. Additionally, teachers' academic achievements can be showcased both within the university and to their peers, which further increases the recognition and impact of their teaching practices. Secondly, concerning the improvement in student learning experiences, the project places significant emphasis on the quality of these experiences. By enhancing students' scores on assignments related to ideological and political education, the project has led to a decrease in the monotony typically associated with data

analysis. This change is specifically demonstrated through increased attendance rates, higher rates of students sitting in the front rows, and improved completion rates of classroom experiments. Furthermore, students' participation in class has notably increased, as evidenced by the rising frequency of students looking up, raising their hands to respond to questions, and engaging actively with teachers. These shifts cultivate a more active engagement in learning and enhance both the initiative and enjoyment of their studies. Finally, regarding the enhancement of student research capabilities, the project actively encourages students to participate in scholarly activities, thereby advancing their research skills and levels. For example, within the "Research-oriented Auditing" initiative, the

frequency of statistical analysis software usage in students' summer practice reports has noticeably increased, indicating that students have become proficient in utilizing statistical analysis tools for data analysis. Concurrently, students have excelled in various research projects and competitions, showing increased application of quantitative analysis methods in events such as the "Challenge Cup," "Internet Plus," and innovation projects. Additionally, students' participation in their academic advisors' research projects has increased, the rate of published papers has risen, and the frequency of attendance at both domestic and international academic conferences has also grown, all of which lays a robust foundation for students' future academic pursuits and career developments. Detailed information is presented in Table 2:

Table 2. Expected Outcomes of Ideological and Political Education Project Construction in Business Data Statistical Analysis Applications (Based on Stata)

Primary Indicator	Secondary Indicator
Enhancement of the Effectiveness of Teaching Evaluations	-Student evaluation scores are excellent; -Peer evaluation scores are excellent; -Faculty teaching accomplishments are showcased within the institution and presented to peers
Improvement in Students' Perceived Achievements	-The score rate for students' assignments in ideological and political education projects has increased; -The sense of monotony experienced during student data analysis has decreased, reflected in improved attendance rates, higher percentages of students sitting in the front row, and increased completion rates of classroom experiments; -Student participation in class has enhanced, indicated by a greater frequency of students holding their heads up, an increased rate of actively raising hands to answer questions, and more frequent interactions with teachers
Application	-The frequency of usage of

of Data Analysis Tools in Enhancing Research-Oriented Auditing	statistical analysis software in students' summer internship investigation reports has increased; -The frequency of employing quantitative analysis methods by students in competitions such as the "Challenge Cup," "Internet+," and Innovation and Entrepreneurship projects has increased; -The rankings of students in mathematical modeling and data prediction competitions have improved
Enhancement of Students' Research Competence and Recognition of Research Achievements	-The involvement of students in their supervisors' research projects has increased; -The percentage of students publishing academic papers has risen; -The frequency of students attending both international and domestic academic conferences has increased

The evaluation framework for the effectiveness of curriculum-based ideological and political education should ensure high practicality and comprehensively and objectively reflect students' performance and growth during project-based learning. Through this assessment framework, we can collect data and clearly observe the positive changes resulting from curriculum development, thereby providing decision-making support for subsequent continuous improvement and optimization.

5. Conclusions of the Study

Currently available statistical textbooks and online courses primarily focus on the introduction of techniques and methods, often lacking engagement and diverse educational materials, leading to a somewhat monotonous learning experience. This article examines the course "Application of Business Data Statistical Analysis" in the auditing discipline, positioning its political education philosophy and objectives from four perspectives: the guidance of the Party, the Ministry of Education's National Standards, industry development trends, and professional training goals. Furthermore, the paper refines the teaching objectives and political education

targets of the course. It subsequently presents strategies and measures for enhancing the ideological and political education aspect integrated with the course content, as well as establishes an evaluation system for assessing its effectiveness. This article aims to provide a reference for the construction of ideological and political education in statistical analysis software courses across other higher education institutions.

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