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Exploring the Optimization Path of Ideological and Political Education in Statistics Courses for Economics and Management Majors

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Abstract: In the talent cultivation of economics and management field, the Statistics is a basic course of methods that has the instrumental aspect as well as idea aspect. In recent years, the Statistics teaching team of School of Business of Jianghan University has tried to link the goal of guiding students to take virtue on foot with that of service to the national strategy. We set up a teaching route from "actual problems" starting from actual cases, traced by actual problems, and ending in hands-on practice. The preliminary teaching comments from students show that they are more willing to study statistical thinking by themselves and, at the same time, more willing to think about social values in data. The "good" self-development of professional competence and values awareness demonstrates the possibility that this route can serve as a replicable model of conferring with the ideological and political education to an economics and management course.

Keywords: Economics and Management Majors; Statistics; Curriculum-Based Ideological and Political Education; Teaching Reform

1. Introduction

For economics and management majors, the teaching mission is not only to give students the technical skills of accounting or modelling. A deeper mission is to enable students to recognize that behind each economic decision are implications of public benefit and public liability. Statistics, as an underpinning course in economics and management, is at the junction of analytical and argumentation modes of thinking. It is teaching students how to conduct economic analysis, market forecasting, decision-making and policy evaluation; while it also affects students' scientific attitude, reasoning ability, social sense of being accountable in the communication of knowledge [1]. Based on the core ideology of economics and management education, in this article we design innovative ideas of combining the ideological and political course in the teaching of statistics. Our target is to reach consistency between knowledge transmission, skill training and value creation, providing practical reference for China's curriculum reform in this major.

2. Current Problems in Integrating Ideological and Political Education into Statistics Courses

2.1 Superficial Integration of Ideological and Political Elements

Typically, instructors add standalone ideological examples next to the main course, or moralistic reflection is added on the end of a lecture. A class might begin with a brief story on a statistician's patriotism, or a particular statistical method might be forcefully asserted to embody "scientific spirit". But students become somewhat skeptical about this, as the ideological content seems to be added on, and not built in. A deeper problem is the inadequate digging of dialectical thinking contained in the history and methodology of statistics. The passage from "Staatenkunde" (state description) to "political arithmetic" for example has a history behind it as how data might prompt modern state governance—these kinds of underlying particulars are often overlooked. Such label-affixing makes ideologies into dead teaching, makes professional knowledge transfer turn out mechanical [2].

2.2 Insufficient Professional Relevance of Teaching Content

Existing teaching cases mostly exist in generic textbooks with weak connection to current economic issues and real concerns of economics and management students. There is a clear gap between what is taught and what students would

like to know professionally. Their content does not demonstrate how statistics does to national strategy, analyses economic phenomena and helps to make business decisions [3]. If teaching resources come apart from economic reality, then students would fail to see the role of discipline on national development, and their enthusiasm in learning inevitably declines. In the current examples, heavy stresses exist on software applications and data cleaning and little emphasis falls on the social meaning of the numbers behind the numbers [4].

2.3 Weakened Value-Guiding Function in Practice-Based Teaching

Current practice sessions heavily emphasize software and data cleaning, but there is little mention of the social responsibility behind the numbers. Think of what happens after students conduct a survival analysis on the passengers of the Titanic: students might have learned contingency tables and the chi-square test, but perhaps never ask why third-class passengers had a lower survival rate, or whether the data imply social injustice. The "technique first, values second" design of practice teaching is putting students at risk for a numbers only mindset—they see the data but ask no question of what the data mean [5].

3. The Necessity of Integrating Ideological and Political Education into Statistics Courses

3.1 Alignment with Core Objectives of Economics and Management Talent Cultivation

Economics and management programs aim at more than teaching practitioners who can run descriptive statistical analyses. They aim at developing practitioners capable of applying statistical analysis to rational decision-making. For a student who might one day help to make economic policy, an education that stops with "how factor A affects factor B" and does not look at how data affects people's lives is fundamentally incomplete. Graduates of these majors enter corporate strategy positions or public policy positions, and values education is central, not marginal, to their professional preparation. More than teaching statistics, this course should help students internalize value: help them understand our country's national development course, national advantages and strengths through statistics, so that professional skills and sense of national purpose grow together [6].

3.2 Tapping into the Inherent Value of Statistics as a Discipline

Statistics is much more than number-crunching. It embodies the historical perspective, dialectical analysis and social conscience. Take the t-distribution: few students will be aware that the t-distribution originated in 1908 from the small-sample quality-control experiments on malt extract that William Sealy Gosset did for the Guinness Brewery in Dublin—and the theory of t-distribution came out of the experiments. Using small samples to measure the concentration of maltose, he gave a response to a real practical need of industry—when sample sizes are small, using sample variance to estimate population variance puts the bias into any z-statistic-based inference. The story tells a simple message: statistics has never been an exercise in abstraction from reality, it comes from real problems.

Logic of induction and deduction in statistics is nothing but the epistemology of dialectical materialism in action. When learning hypothesis testing, students tend to be obsessed about calculating the p-value and missing a deeper scientific reasoning that moves from the sample to the population. When classroom conversations make students thinking about "why does statistical significance not mean real-world truth", etc., they will do a better job of cultivating respect for evidence, and habits of critical thinking in the course.

Statistics also has what can be referred to as a 'practical philosophy'. Statistical methods originate from concrete need: from 'tallying knots' on ropes in ancient times to the modern big data analysis, every new method comes out of actually observing and solving problems. This 'from practice, to practice' philosophy is easily joined to the educational ideal of unifying knowledge and practice [7].

4. Core Principles for Identifying Ideological and Political Elements

The identification and integration of ideological and political factors should avoid the error of disconnect between professional content and value education. Three guiding factors—professionalism, targeted design, and practicality—can help to achieve the relevant linkage to the professional qualities, educational

purposes and practical needs of statistics education for students of economics and management.

4.1 Principle of Professional Relevance

A common pitfall is making design of ideological material for itself—appending the results in terms of value to a finished lesson. When ideological features are separated from the knowledge, students go to sleep during the "moral" portion; forced linkage may induce resistance.

Deep integration requires that ideological features be borne by core professional knowledge and built into case design. For example, for a case study on the Keynesian consumption function, students estimate the propensity of consumption from 100 samples of household budget details and test different theoretical hypotheses. Along the way, students can internalize the technical details of the OLS regression technique and learn to understand how their choices of sample setting, parameter estimation errors, and statistical significance testing affect macroeconomic policy. Students immersed in the full process reflect more profoundly than students that receive a direct exhortation.

4.2 Principle of Targeted Design

At the level of value education, a one-size-fits-all model should not be adopted. Students in the field of economic management, after professional training, serve the development of the economic society and need to select ideological elements from national cognition, scientific thinking, and social responsibility. Within the scope of national consciousness, the introductory part of statistics can involve the situation where "statistics" was introduced into China from the German "Statistika", and focus on telling about "Lectures on Statistics" translated by Niu Yongjian in 1903, which was born due to the needs of governance in the late Qing Dynasty. Such historical backgrounds make the evolution of disciplines closely connected with the future of the country, and the connection is more profound than empty slogans. In the dimension of scientific spirit, by means of instances such as the positive correlation between the longevity of married men and marital satisfaction, and the spurious correlation between ice - cream sales and drowning deaths, guide students to recognize the cognitive traps brought by reverse causality and confounding variables; at the level of social responsibility, the macro - economic statistics module explores global issues such as carbon emission transfer, helps students understand the role of statistical analysis in international discourse, and cultivates students' professional sense of responsibility to use statistical knowledge to serve national interests.

4.3 Principle of Practical Orientation

Statistics has practical characteristics. Values education can make use of its inherent attributes, and the guiding logic followed is "from practice to practice". [8].

"From practice" means that the key statistical methods were not developed in abstract theory—they sprang out of practice straight from practical problems (such as one wants to measure something accurately, or one needs to make a smart decision on the spot). A classic example is the t-distribution. It originally emerged from real-world problems of breweries when testing small samples of malt extracts: with small sample size, using sample variance instead of the population variance caused the bias in z-statistic-based decision-making. To solve this specific industrial quality control problem, people did countless simulation experiments and finally came up with the t-distribution—a new statistical "ruler", which enables far better inference. Sharing such stories of developments of a discipline with students helps them realize that statistical methods are basically problem-solving tools, whose power lies in deep insight and response to real-world problems—a mind that establishes the connection between theory and practice.

"Go to practice"—this means we should use teaching materials close to real life, social situations and easy for students to get into. For example, in recent years, many universities used the visualized reports (or "freshman big data") that are released on "freshman big data". These reports are excellent teaching cases. At Soochow University, bar charts are piled up to clearly show gender distribution for each college—giving rich information in a small window, just like "big insights in small space" characteristic design. At University of Science and Technology of China and South China University of Technology, they ingeniously added the logo picture of local beloved food in displaying the hometown background of

freshmen. It is both vivid and warm. These examples from students' daily lives not only make the political education concept - "data presentation must be professional, but also humanist" - concrete and familiar, but also excite students with greater interest and enthusiasm to use statistical tools to learn about their own world [9].

5. The "Case-Driven, Problem-Oriented, Practice-Empowered" Teaching Pathway

5.1 Case-Driven Approach: Integrating Value Guidance in Authentic Contexts

Teaching based on real world cases is based on using true, typical cases to specifically make abstract statistical ideas and methods more concrete and practical. It will also help the students to understand the professional knowledge of statistics, and subliminally puts forward guidance on values when teaching the students to analyse cases. On one hand, teaching doer needs to be careful to choose the cases used, representative and engaging ones—they must arouse emotions and make learning the method and value reflect connection rather artificial. At the same time, the design of a case should naturally merge subject-subject subject matter content and ideological content, and avoid bad connections. When introducing the analysis of cases, lead the students to start with problem, think actively on their own, make judgments, so as to foster the students' ability to think actively and critically [10].

Take for example the classic example of "Titanic passenger survival analysis"—teachers can use it to lead students to learn about such statistical methods as contingency analysis and independence test, at the same time encourage them to ponder deeper human and ethical issues behind the data. For the class, we can start by showing the famous "women and children first" scene of Titanic movie to arouse initial thinking on life rights and moral choices during disasters. Then we can focus on the relationship between male and female passengers, walking through building the table of independence, doing the independence test, exploring their correlation. Following that, teachers can propose some realistic historical background—such as third-class passengers have limited boarding escape opportunities—to help students explore the statistical data showing correlation of survival rate and cabin class. Finally, by comparing the humanitarian principle of "ladies first" with inequality of access to survival stemming from differences in social classes, students appreciate how statistical significance ties into issues of broader social justice and ethics.

5.2 Problem-Oriented Approach: Cultivating Decision-Making Capacity through Real-World Problems

Problem-oriented teaching emphasizes starting with practical problems encountered in the management field and proceeding in the logical order of "realistic situation - statistical methods - scientific and effective decision-making". In this way, the students can learn statistical thinking and decision-making skills associated with their future careers as they find problems, analyze problems and solve problems. The guarantee of its success is to make sure that the problems adopted are rooted in real management works and avoid making up false works which are not linked to reality. Developing problem ideas must closely match the main ideas in statistics, linking the teaching of methods naturally to facing professional problems, and also having associated valuable elements, enabling professional thinking to serve educational ideologies and politics.

For instance, when explaining the chi-square distribution, teachers can start by showing students the discrepancy in the real sales volume of different products in a supermarket from their projected target. Next, ask the question: "Given this situation, should the supermarket adjust the procurement and marketing plans?" Instantly students will show their interest, thinking "How can data enhance marketing efficiency?" Then have them follow along step by step to understand how the chi-square statistics are obtained: first make students calculate the differences between actual and expected values themselves, and they will easily find out that just summing them up does not work because positive and negative values just cancel each other out, and the sum of deviations is blurred. Then, suggest that they "square the differences to make positive and negative effects no longer have effect." Then, introduce the idea of expected value for standardization, and here it comes: chi-square statistics. With such a teaching approach, students can learn their statistical knowledge and professional skills simultaneously in the process of learning.

5.3 Practice-Empowered Approach: Strengthening Responsibility through Application

The practice empowerment part of the course design intends to encourage students to use statistical methods in real work practice to transform knowledge into skills and value through the "classroom practical simulation + out of classroom practice". To get there, we need to move from the old-school style of teaching "teachers teaching and students doing exercises" and develop a practical teaching system based on teaching practice activities such as project-based practice, social survey practice and scientific research practice [11].

In class, we can create simulation projects to simulate the real-life situation to train students on the standardized process of statistical work. For example, we can teach students through publicly available micro data, such as the China Household Finance Survey (CHFS), how to carry out the entire process from sample design, data cleaning, to data preliminary analysis. When students are immersed in the real data of people's income, expenditure, assets, they can, naturally, have a deeper understanding about the people's life conditions and enhance their sentiments for being socially responsible.

Outside the classroom, students should be actively encouraged and guided to participate in professional competitions like the "National College Student Market Survey and Analysis Competition" or apply for scientific research projects such as the "College Student Innovation and Entrepreneurship Training Program," accompanying them throughout the entire process from topic selection and design, data collection, to report writing [12]. Such hands-on experiences markedly improve students' statistical application skills and innovative thinking while guiding them to pay attention to social issues and think about how professional knowledge can serve national strategies and social needs. In real, unfiltered practice, students are more likely to appreciate the social value embedded in statistics as a discipline of practical engagement, gradually building a professional commitment to "serving society through data" and achieving parallel growth in knowledge, capability, and values.

The core elements of the teaching pathway described above are summarized in Table 1.

Table 1. Teaching Pathway Design

Teaching Pathway	Core Concept	Implementation Key Points	Representative Cases	Integration Points
Case-Driven	Using authentic contexts to make abstract statistical methods concrete; achieving resonance between professional knowledge and value guidance	Case selection balances representativeness and intellectual provocation; design ensures organic unity of professional and value content; analysis guides problem reflection and dialectical thinking	Titanic passenger survival analysis	Humanistic care, social equity, dialectical thinking
Problem-Oriented	Grounded in real economic-management problems; cultivating statistical thinking and decision-making through the identify-analyze-solve cycle	Problems originate from genuine economic-management scenarios; design is tightly linked to core statistical knowledge; extension carries value implications	William Sealy Gosset's t-distribution and brewery quality testing; chi-square distribution and supermarket operations	Statistical thinking, scientific decision-making, serving society
Practice-Empowered	Using dual classroom-extracurricular practice to drive the transformation from knowledge to capability, strengthening responsibility awareness	Classroom practice emphasizes process norms and value guidance; extracurricular practice emphasizes real-world scenarios and method application	CHFS microdata simulation; statistical modeling competitions; student research projects	Professional ethics, concern for livelihoods, social value identification

6. Conclusion

Statistics is both a science of data processing and a mode of understanding that integrates historical wisdom, scientific spirit, and social concern. The "case-driven, problem-oriented, practice-empowered" teaching pathway we have explored offers a workable approach to integrating ideological and political education into statistics courses for economics and management majors. It targets the disconnection between professional knowledge and value education, promoting their natural fusion in the teaching process. Preliminary practical feedback indicates that this approach helps students enhance their statistical analysis ability, talent professional capacity and ideological and political awareness.

As to constantly improving the effect of teaching, to the future effort, we should pay more attention to improve the implementation guarantee mechanism of the education effectiveness: in

terms of teaching contents, to establish a dynamic updating mechanism of teaching contents to promptly incorporate new cases from economic and social development, keep relevancy and foresight; in terms of teaching methods, actively promote blended learning and flipped classroom to improve the teaching appeal, students' attention; in terms of assessment and evaluation, to build a diversified assessment system that should include classroom discussion, project report, practice accomplishment, and improve the long-term evaluation for the effect of ideological and political education teaching. On behalf of teacher training, teachers themselves can broaden their horizon through relevant interdisciplinary research and temporary positions in enterprise, and integrate real situations into their design of teaching contents, to make the ideology and political education curriculum more profound and popular.

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