

Research on the Integration of Case Teaching and Ideological and Political Education in the Postgraduate Course "Management Science Research Methods"

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Abstract: This paper takes the postgraduate course "Management Science Research Methods" as the research object and systematically explores the deep integration path of case teaching and ideological and political education. Propose the four-dimensional curriculum design principle of "taking theoretical methods as the benchmark, practical exploration as the core, authoritative literature as the model, and value guidance as the goal", and construct a teaching system integrating social hotspots, cutting-edge tools, academic literature and ideological and political elements. Teaching practice shows that this model has significantly enhanced students' ability to apply methods, innovative consciousness and sense of patriotism, providing a replicable implementation path for cultivating high-level economic and management talents in the new era.

Keywords: Management Science Research Methods; Case-Based Teaching; Curriculum Ideological and Political Education; Graduate Education; Ideological and Political Integration.

1. Introduction

With the continuous advancement of the construction of new liberal arts and interdisciplinary studies, postgraduate education increasingly emphasizes the coordinated development of methodological training and value shaping [1-2]. Management Science Research Methods, as a compulsory core course for academic master's degree students in Management Science and engineering, covers a variety of qualitative and quantitative methods such as multivariate statistics, operations research, structural equations, comprehensive evaluation, econometrics, machine learning, social network analysis, and text analysis. It plays a significant role in enhancing students' research capabilities and innovative thinking. As a strategic measure to implement the fundamental task of "cultivating virtue and nurturing talent", ideological and political education in courses has received extensive attention in the construction of economic and management-related professional courses since it was fully promoted by the state in 2018. Its organic integration with professional courses has become an important direction for the reform of higher education teaching [3]. Case teaching, as an effective way to connect theoretical knowledge with practical application, its integration model and internal logic with ideological and political education have become a research hotspot in higher education reform[4-5]. This course aims to cultivate students' ability to master solid management scientific research methods and solve real problems in Chinese management practice as its core objective. Through the following four integrated paths, it achieves a deep integration of knowledge imparting, ability cultivation and value guidance.

2. Based on Methodology Foundation, Integrating Hot-Topic Cases to Cultivate a Scientific and Rigorous Academic Style

The course moves away from isolated teaching of methods for their own sake and adheres to the principle of "methods as the foundation, cases as the application." Each research method is paired with hot-topic cases that reflect national strategic needs and social livelihood, guiding students to master the methods while understanding their application contexts and social value. This approach fosters a rigorous and conscientious academic attitude. For example:

In the multivariate statistical analysis section, the case study "*Measurement of Common Prosperity Levels and Analysis of Spatio-Temporal Evolution Patterns*" introduces principal component analysis for evaluation. Techniques such as the Theil index, Moran's I, kernel density estimation, and Markov transition probability matrices are used to analyze regional disparities, spatial autocorrelation, temporal evolution, and dynamic patterns of common prosperity. This deepens students' understanding of descriptive statistics and multivariate analysis in addressing economic issues like common prosperity.

In the policy effect testing and causal inference section, students study the paper "*Can Open Public Data Promote Corporate Open Innovation?*" Through this, they not only master key techniques like Difference-in-Differences (DID) and PSM-DID model specification, parallel trend testing, placebo tests, and robustness checks but also develop a grounded perspective on scientifically evaluating public policy effectiveness.

In the structural equation modeling section, the case "*Can Smart Elderly Care Products Improve Mental Health?*" teaches students to construct structural equation models analyzing the impact of smart product adoption on elderly mental health, including the chain mediation effects of social

interaction and attitudes toward aging. This highlights the advantages of SEM in unraveling complex psychological and behavioral mechanisms.

In the spatial econometrics and social network analysis section, the study *"The Impact of Digital Infrastructure on the Construction of a Unified National Market"* introduces the construction of spatial weight matrices, spatial correlation, and spatial econometric model testing, helping students grasp the spatial dependence and spillover effects in economic activities. Additionally, the paper *"Network Characteristics and Dynamic Mechanisms of Digital Economy Policy Diffusion"* demonstrates how to use social network analysis to build diffusion networks and quantitatively analyze policy diffusion traits and dynamics, offering new perspectives for understanding complex policy systems.

For efficiency measurement and comprehensive evaluation, the paper *"Evaluation of ESG Disclosure Quality of Power Generation Listed Companies"* introduces the entropy-weighted TOPSIS method, with extensions to other techniques such as the Analytic Hierarchy Process (AHP), vertical and horizontal scatter degree method, CRITIC method, and integrated subjective-objective weighting methods. This enables a comparative understanding of the applicability of different comprehensive evaluation approaches. Furthermore, the study *"Empirical Measurement of the Operational Efficiency of China's Carbon Trading Pilot Markets"* employs the DEA-Malmquist model to statically and dynamically measure and analyze the operational efficiency of these markets. Students are also encouraged to self-study extended models such as "DEA with Undesirable Outputs", "Malmquist-DEA", "Windows-DEA" and "Three-Stage DEA Considering Environmental Influences".

3. Practice-Oriented Learning, Strengthening Tool Application, and Embodying the Spirit of Exploration

The course emphasizes "learning by doing" through comprehensive research practice training, aiming to develop students' exploratory spirit and practical abilities in addressing real-world complex social issues.

In terms of software tool application, students are required to use Stata for data cleaning and most econometric models, R or Python for machine learning, text analysis, and data scraping, AMOS for structural equation modeling, UCINET for social network analysis, and ArcGIS for spatial visualization and spatial econometric analysis. Students are encouraged to access and adapt source codes from top-tier international journals such as American Economic Review (AER), Journal of Political Economy (JPE), and Quarterly Journal of Economics (QJE), or from authoritative Chinese journals like Management World, China Industrial Economics, Journal of Quantitative & Technological Economics, and Economics (Quarterly). For example:

By studying the source code of the paper *"Does Innovation-Driven Policy Boost Urban Entrepreneurship?"*, students learn the specific approaches for implementing multi-period PSM-DID models, including year-by-year matching and overall matching, as well as using the *twowayfweights* command in Stata for robustness checks of heterogeneous treatment effects in multi-period DID.

The source code of *"Network Infrastructure, Inclusive*

Green Growth, and Regional Disparities" combines machine learning algorithms (e.g., random forests, Lasso) with causal inference frameworks like double machine learning to handle high-dimensional data and complex functional forms. Students are guided to construct double machine learning models using Python libraries (e.g. scikit-learn) and Stata under different algorithms and sample splitting ratios, while employing R for mechanism testing. This cultivates their courage and capability to embrace cutting-edge technologies and tackle more complex problems.

The course also fosters data resource mining and open science practices. Students are encouraged to obtain corporate financial data from databases such as CNRDS, CSMAR, and Wind, macro-level data from the National Bureau of Statistics and the China Data Platform, and unstructured data from government work reports and policy documents. They also learn to design questionnaires or conduct online experiments.

Additionally, the integration of AI-assisted programming tools is introduced. Through the study of the article *"Application of GPT in Text Analysis: An Introduction to an Integrated Stata Command"*, students learn to use the Stata command *chatgpt* developed by the author, leveraging large language models for text data analysis. This enhances their efficiency in text data processing, optimizes text indicator characterization, improves measurement accuracy, and enriches the informational value of text indicators. This process not only hones students' data analysis skills but also instills a commitment to academic integrity, adherence to scholarly norms, and respect for data authenticity.

4. Leveraging Authoritative Literature to Cultivate Innovative Thinking

This course selects classic and cutting-edge papers from authoritative journals such as Management World, Economic Research Journal, and China Industrial Economics as exemplars of methodological application and academic innovation, fostering students' innovative thinking through the following aspects:

From "Intensive Reading" to "Replication". Students are guided to deeply deconstruct selected literature, mapping out their technical roadmaps and mind maps to clearly understand the complete logical chain—from problem identification, theoretical foundation, research design, model specification, mechanism analysis, robustness checks, and further analysis to conclusions and recommendations. Students are required to replicate the core models of classic papers using code, allowing them to deeply appreciate the ingenuity of research design and the rigor of detailed execution in the process.

From "Critique" to "Transfer". Students are guided to engage in critical thinking. For instance, by comparing and reading papers like *"Does Smart Manufacturing Lead to 'Machines Replacing Humans'?"* and *"Artificial Intelligence and Employment Effects: A Dual Perspective Based on Both the Quantity and Quality of Employment"*, they discover that smart manufacturing penetration significantly reduces labor demand at the enterprise level, while it increases labor demand at the industry level. Mechanism analysis reveals that the substitution effect on enterprise labor is strongest, with weaker creation and productivity effects, whereas for industry labor, the creation and productivity effects are stronger, and the substitution effect weaker, leading to these heterogeneous outcomes at micro and macro levels. This guides students to

ponder the reasons behind these seemingly contradictory conclusions from various angles—macro vs. micro, long-term vs. short-term, structural effects vs. substitution effects—understanding the complexity of research. Furthermore, students are encouraged to transfer research ideas, contemplating questions like: Is the research method used the optimal choice? Is the mechanism analysis sufficient? From what other dimensions could heterogeneity analysis be conducted? How generalizable are the conclusions? Can the DID framework be used to study other regional policy effects? This cultivates students' academic appreciation and innovative awareness.

5. Aiming for Value Guidance, Integrating Ideological and Political Elements, and Fostering National Sentiment

The ultimate learning goal of research methods is to guide students to focus on China's realities and serve national development. Case teaching integrates ideological and political elements throughout the entire research training process.

First, Focusing on Major National Strategies. Cases cover national strategies such as rural revitalization, technological innovation, common prosperity, new quality productive forces, green development and the "Dual Carbon" goals, the unified national market, and Healthy China. Through their research, students naturally deepen their understanding of national conditions and policies.

Second, Cultivating Social Responsibility. Students are guided to focus on the people and society behind the research. For example, cases like *"Research on the Evaluation of Anti-fatigue Mechanisms for Food Delivery Rider"* focus on the rights and interests of workers in new forms of employment; *"Is an Overseas Degree No Longer Advantageous?—Evidence from a Resume Submission Experiment"* addresses employment equity; *"Can Smart Elderly Care Products Improve the Mental Health of Older Adults?"* concerns the well-being of the elderly; and *"Research on Factors Influencing Employment Outcomes of Graduates with Disabilities from Universities"* focuses on employment for people with disabilities. Reading and replicating such papers prompts students to contemplate the human aspect of management and fosters a sense of responsibility for caring about socially vulnerable groups and promoting social fairness and justice.

Third, Emphasizing Teamwork Spirit. Multiple research topics are set, involving concentrated discussions on the basic ideas and research frameworks of specific topics to form research paths. Topic groups (2-3 students) simulate a real research environment, requiring students to complete the entire process from topic selection, literature review, data collection, and analysis to report writing through teamwork. Groups present their work in class and undergo collective critique. This process cultivates students' teamwork spirit, innovative research attitude, social responsibility, and sense of mission.

Finally, Establishing Awareness of Academic Integrity. Strengthen Academic Norms, Fortify the Ideological Foundation. The course explicitly emphasizes data authenticity, code reproducibility, and standard literature citation practices, helping students deeply understand that integrity is not only a moral requirement but also a

fundamental prerequisite for academic practice. Focus on Practical Guidance, Cultivate Rigorous Habits. Integrity education is embedded in case practical operations. For instance, students are required to submit complete, reproducible data processing workflows and code documentation, emphasizing the retention of raw data and annotation standards. Through process evaluation, instructors promptly correct non-standard practices during paper replication, helping students develop a scientific and rigorous research style through practice. Integrate Curriculum Ideology and Politics, Shape Academic Character. Academic integrity education is combined with the spirit of scientists and socialist core values. Positive examples of excellent scholars who seek truth from facts and dedicate themselves to research are used to inspire students to set academic aspirations of pursuing truth, upholding integrity, and innovating. Students are guided to understand that integrity relates not only to personal reputation but also to disciplinary development, national technological innovation, and the dignity of the academic community, thereby achieving the organic unity of value shaping, ability cultivation, and knowledge impartation.

6. Conclusion and Outlook

This study has established a teaching model that deeply integrates case-based teaching with curriculum-based ideological and political education, achieving an organic unity of knowledge impartation, ability cultivation, and value guidance in the Management Science Research Methods course. Supported by hot-topic social cases, cutting-edge software tools, authoritative literature, and national strategic orientations, this model has effectively enhanced graduate students' proficiency in applying research methods, their innovative consciousness, and their sense of social responsibility.

Future efforts can focus on the following aspects: First, developing more teaching cases based on the Chinese context to strengthen students' cultural and theoretical confidence. Second, establishing inter-university teaching alliances to share high-quality educational resources. Third, exploring the application of intelligent teaching tools in methodology courses to improve teaching efficiency. Fourth, strengthening international cooperation and exchange to assimilate advanced foreign teaching methods, thereby promoting the development of a management research methods curriculum system with distinctive Chinese characteristics.

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