

Enhancing Teaching Quality in the Graduate Course Decision Theory and Methods: Pathways and Practices

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Abstract: To improve the teaching quality of the graduate course Decision Theory and Methods and better meet graduate training needs, this study analyzes data from a course teaching quality questionnaire covering course design, teaching and learning processes, overall satisfaction, learning needs, and existing problems. The results show high overall teaching quality and student satisfaction, with strong recognition of the instructor's teaching attitude, expertise, and teaching methods. However, issues including insufficient frontier-oriented content, an imbalance between theory and practice, limited integration of literature reading and research training, and the need to improve assessment methods. Based on the findings, this study proposes systematic reform measures centered on integrating literature reading into teaching, including content restructuring, teaching model innovation, assessment optimization, and strengthened practical training, providing references for enhancing graduate course quality.

Keywords: Decision Theory and Methods; Graduate Course; Teaching Reform; Questionnaire Survey; Teaching Quality.

1. Introduction

Under the overarching goal of promoting high-quality development in graduate education in the new era, course teaching has been assigned a more significant mission. The Ministry of Education has emphasized the need to comprehensively improve the quality of graduate courses, strengthen their frontier orientation, systematic structure, and innovativeness, promote the integration of research and teaching, enhance research training and innovation capacity, and facilitate the integrated development of graduate students' knowledge, abilities, and overall competencies[1]. In recent years, scholars have generally recognized that graduate education in China is shifting from a knowledge-transmission orientation toward an innovation-oriented model, making course teaching a key component in improving talent cultivation quality [2].

Graduate courses must move beyond traditional teaching models and develop student-centered systems focused on competence development[3]. Decision Theory and Methods is a foundational course for master's students in disciplines such as Management Science and Engineering, Business Administration, and Public Administration. Characterized by theoretical rigor, methodological applicability, and academic frontier relevance, the course plays an essential role in cultivating scientific decision-making thinking, quantitative analytical skills, problem-solving abilities, and academic research literacy[4]. The course covers core theories and methods including decision-making under uncertainty, multi-attribute decision-making, group decision-making, game-theoretic decision-making, and dynamic decision-making. Its extensive content, strong logical structure, and wide range of applications place high demands on teaching relevance, interaction, practical engagement, and frontier integration [5].

However, several practical challenges remain in current teaching practice. First, course content relies heavily on classical theories, with insufficient integration of frontier research achievements, resulting in a gap between teaching and academic developments. Second, teaching methods remain relatively traditional and lecture-centered, leading to

limited student participation and weak implementation of literature reading, academic discussion, and practical application activities. Third, assessment approaches are relatively singular, with inadequate process-based evaluation, making it difficult to comprehensively assess students' overall competencies[6-7]. Existing studies suggest that the key to graduate course reform lies in building an integrated "knowledge-competence-innovation" cultivation system and strengthening formative and process-oriented evaluation mechanisms [8].

To objectively reflect the actual status of course teaching, accurately identify instructional shortcomings, and scientifically design reform pathways, this study conducted a specialized teaching quality questionnaire survey among master's students enrolled in the course of Decision Theory and Methods. Based on survey data, the study systematically analyzes student satisfaction and core demands regarding course construction, teaching processes, and learning experiences, identifies prominent existing problems, and proposes targeted teaching reform strategies. The findings aim to provide data support and practical guidance for continuous course improvement and offer reference models for teaching reform in similar graduate-level management courses.

2. Research Design and Data Sources

2.1. Research Design

This study follows the principles of problem orientation, data-driven analysis, reform focus, and practical effectiveness, aiming to diagnose the current teaching situation and design reform strategies for the Decision Theory and Methods course. The research framework proceeds through a systematic technical route, including questionnaire design and implementation, data organization and analysis, identification and examination of teaching problems, and construction of teaching reform measures. Student evaluations and learning needs serve as the primary basis to ensure accurate problem identification, feasible reform strategies, and reliable research conclusions.

In terms of methodology, the study mainly adopts questionnaire surveys, statistical analysis, literature review, and experiential summary methods. The questionnaire survey is used to systematically collect students' evaluations and suggestions across different course dimensions. Statistical analysis is applied to conduct descriptive analyses of scale scores and response proportions to objectively present the teaching status. Literature review provides theoretical support by synthesizing domestic and international research on graduate course teaching reform. The experiential summary method integrates teaching practice with survey findings to extract practical and transferable improvement strategies.

The questionnaire was designed to cover the entire teaching process and student learning cycle, ensuring a scientific structure and comprehensive dimensions. The questionnaire contains 17 items divided into three parts. The first part collects basic information, including gender, degree type, study mode, academic year, and whether students were admitted across disciplines (5 items), aiming to describe the sample structure. The second part consists of matrix-scale questions covering four modules, course construction, teaching process, learning process, and overall satisfaction, using a five-point Likert scale to quantitatively evaluate key indicators such as course objectives, teaching attitude, assessment methods, and overall satisfaction. The third part includes multiple-choice and open-ended questions addressing graduate training priorities, preferences for course content and teaching methods, competency development orientation, assessment preferences, existing course problems, and open feedback and suggestions. The questionnaire integrates quantitative evaluation with qualitative feedback, enabling a comprehensive and objective reflection of course teaching conditions.

2.2. Data Sources

The data used in this study were obtained from a specialized teaching quality survey conducted for the graduate course of Decision Theory and Methods. The questionnaire was distributed and collected after course completion and was completed anonymously to ensure objectivity and authenticity of responses.

The cohort consisted of 10 graduate students enrolled in the course. A total of 10 questionnaires were distributed and all were returned as valid responses, yielding a 100% valid response rate. The sample characteristics are as follows: in terms of gender, 4 males (40%) and 6 females (60%); in degree type, all participants were academic master's students (100%), with no professional-degree students; regarding study mode, all participants were full-time students (100%), with no part-time students; all respondents were second-year graduate students; and regarding disciplinary background, 4 students (40%) were admitted across disciplines, while 6 students (60%) were from related majors. The sample structure is consistent with typical characteristics of management-related graduate student cohorts and adequately reflects the actual teaching situation, providing reliable data support for subsequent problem analysis and reform design.

3. Questionnaire Survey Results and Analysis of Teaching Problems

In teaching the dual simplex method, the primary objective is to help students understand the essence of solving linear programming problems using the dual simplex method and to

master the computational steps involved. The teaching focus lies on the computational procedures of the dual simplex method, while the main difficulty is distinguishing the differences between the principles of solving linear programming via the simplex method and the solution approach of the dual simplex method compared to the primal simplex method. Through a careful study of dual simplex method textbooks, we found that most textbooks describe the relationship between the primal and dual problems starting from Form (1) and then derive the matrix forms. This approach is suitable for students with strong mathematical foundations; however, for students with weaker mathematical backgrounds, the content often appears abstract and difficult to grasp. Therefore, this paper proposes a teaching plan that provides a clear and accessible explanation of the relationship between the primal and dual problems, as well as the principles of the dual simplex method.

3.1. Statistical Results of the Questionnaire Survey

A five-point Likert scale was used to quantitatively evaluate course construction, teaching process, learning process, and overall satisfaction. The average scores were 4.16 for course construction, 4.49 for the teaching process, 4.22 for the learning process, and 4.38 for overall satisfaction, indicating an overall satisfactory level. However, noticeable imbalances exist among specific indicators within each dimension.

Regarding course construction, the main strength lies in the clarity of course objectives (4.5), while weaknesses include insufficient frontier orientation of course content (3.9) and limited diversity of course formats (4.0). Only 30% of students reported being "very satisfied" with the frontier nature of course content, and 40% rated course format diversity as "average", suggesting inadequate integration with disciplinary frontiers and relatively single teaching formats. In the teaching process, the instructor's teaching attitude (4.7) and professional expertise (4.7) received strong recognition with no negative evaluations. However, frontier-oriented teaching content (4.3) and provision of learning resources (4.3) were relatively weaker aspects, as some students noted insufficient extension toward cutting-edge research and limited learning resources. In the learning process dimension, satisfaction with assessment methods was highest (4.6), whereas improvement in research ability (4.0) and innovation ability (4.0) received the lowest scores; 30% of students rated these aspects as "average", indicating insufficient linkage between course learning and research or innovation capability development. All sub-indicators of overall satisfaction received positive evaluations, with learning process satisfaction scoring highest (4.5), while overall satisfaction with course construction and teaching both reached 4.3, reflecting good overall performance but room for improvement.

Regarding graduate training priorities, approximately 80% of students selected disciplinary foundational knowledge, research and innovation ability, practical operational ability, and professional technical skills, demonstrating expectations for comprehensive competency development. In terms of course content emphasis, applicability ranked highest (70%), while theoretical depth and frontier orientation both reached 60%, indicating students' preference for practical application of theoretical knowledge. Concerning teaching methods, 90% of students preferred integrated approaches combining

theoretical lectures with frontier paper discussions and practical teaching, whereas only 20% supported purely lecture-based teaching, revealing strong support for blended and practice-oriented learning. For competency development, 100% of students favored equal emphasis on theory and practice. Regarding assessment methods, open-book examinations and classroom presentations were each supported by 70% of students, group assignments by 60%, while closed-book examinations were supported by only 20%, showing preference for process-oriented and open assessment approaches. The most prominent problem identified was the imbalance between theory and practice (60%), followed by insufficient assessment mechanisms (30%), and course difficulty and limited teacher–student interaction (each 10%). Open-ended feedback further suggested strengthening practical teaching, reducing conceptual difficulty, and increasing integration of literature reading and frontier research content.

3.2. Student Teaching Needs and Core Teaching Problems

(1) Analysis of Student Teaching Needs

Based on the questionnaire results, graduate students' learning needs were systematically analyzed. First, regarding perceptions of graduate training objectives, student demands showed high consistency. Approximately 80% of students selected foundational disciplinary knowledge, research and innovation ability, practical skills, and professional technical competence, indicating that graduate students no longer seek only theoretical knowledge acquisition but increasingly value the cultivation of research capability, problem-solving ability, and professional application competence. This finding reflects the ongoing transition of graduate education from a knowledge-transmission model toward a competence-generation model.

Second, regarding course content structure, students expressed multidimensional expectations. About 70% emphasized practical applicability, highlighting concern for the real-world value of theoretical methods, while around 60% emphasized theoretical depth and frontier orientation, demonstrating the dual expectation of building systematic theoretical foundations while accessing cutting-edge academic developments. This suggests that graduate courses should achieve a dynamic balance among foundational theory, frontier research, and practical application.

Third, in teaching methods, students demonstrated a clear reform-oriented preference. Survey results show that 90% supported a teaching model integrating theoretical lectures, frontier literature discussions, and practical teaching, whereas acceptance of purely lecture-based instruction was relatively low. This indicates that graduate learning has shifted from passive knowledge reception toward active academic participation and problem exploration, requiring courses to strengthen research training through literature reading, academic discussion, and case analysis.

Regarding assessment approaches, students generally favored competence-oriented evaluation. Approximately 70% supported open-book examinations and classroom presentations, while only 20% preferred traditional closed-book exams, indicating stronger preference for process-based and comprehensive evaluation. Furthermore, 100% of students agreed that courses should equally emphasize theory and practice, further confirming the importance of integrated competency development in graduate education.

(2) Diagnosis of Core Teaching Problems

Based on the analysis of teaching needs, the questionnaire further revealed several key issues in current course construction.

Disconnection between theory and practice is the most prominent problem. About 60% of students identified an imbalance characterized by an emphasis on theory over practice. Although the theoretical system of the course is relatively complete, insufficient practical application limits students' ability to connect decision-making theories and methods with real research problems or management contexts, thereby affecting learning transfer outcomes.

Mismatch between learning difficulty and instructional support. Some students reported that the course content is relatively difficult or conceptually abstract, suggesting that layered explanations and learning support for advanced theoretical content require improvement. A small number of students also noted limited teacher–student interaction, indicating the need to further optimize classroom participation mechanisms.

Assessment mechanisms require improvement. Approximately 30% of students indicated that assessment methods lack sufficient targeting and process-based evaluation. The existing evaluation system does not adequately reflect students' learning processes, development of research thinking, or academic expression abilities, suggesting that traditional examination-centered evaluation models are insufficient for assessing graduate-level competency development.

By integrating quantitative results and qualitative feedback, the 2024 survey identified the core teaching problems as insufficient frontier integration of course content, inadequate practice-oriented teaching, weak cultivation of research and innovation abilities, relatively high conceptual difficulty in some topics, and imperfect assessment mechanisms. Meanwhile, students expressed clear demands for stronger integration of theory and practice, innovation in teaching methods, and optimization of assessment approaches, providing clear directions for subsequent teaching reform.

4. Implementation of Teaching Reform Measures Based on Survey Findings

In response to the teaching challenges identified through the questionnaire survey, and in alignment with graduate training objectives and the disciplinary characteristics of the course of Decision Theory and Methods, the teaching team formulated and implemented targeted reform measures across four dimensions: course construction, teaching methods, learning process, and assessment system. The specific measures are as follows.

First, reconstructing teaching content and strengthening frontier orientation and literature support. To address insufficient frontier integration and weak literature training, a three-tier literature resource system was established, consisting of classical theoretical literature, advanced methodological literature, and frontier research literature. For each chapter, one to two high-quality journal articles were incorporated, systematically integrating key research ideas, methodological improvements, and application innovations into classroom teaching to enhance academic frontier relevance. Meanwhile, the course content system was updated to include emerging topics such as intelligent decision-making, big data-driven decision-making, behavioral

decision-making, and complex systems decision-making, promoting deep integration between classical theories and cutting-edge research and improving the course's advanced and innovative nature. Considering the relatively high proportion of interdisciplinary students, complex mathematical derivations were simplified, with greater emphasis placed on methodological logic, application scenarios, and case explanations, thereby lowering learning barriers and improving accessibility and adaptability of course content.

Second, innovating teaching modes through literature seminar integration and blended teaching. A literature-integrated teaching model was comprehensively implemented by establishing a closed-loop learning process consisting of pre-class independent reading, in-class group presentation, instructor feedback and synthesis, post-class reflective writing. Literature discussion was institutionalized as a core instructional component rather than an extracurricular supplement, effectively strengthening graduate students' research thinking and academic training. The traditional lecture-centered model was replaced by a "theory–discussion–practice" triadic teaching approach: theoretical instruction provides foundational knowledge, literature discussion serves as the learning platform, and practical application clarifies learning objectives. Student-centered activities such as case analysis, classroom presentations, group discussions, and problem-based debates were expanded to enhance participation and inquiry-based learning. In addition, diversified teacher–student interaction mechanisms—including real-time questioning, individualized consultation, group mentoring, and online communication—were introduced to strengthen targeted guidance and timely feedback, improving both the depth and effectiveness of interaction.

Third, strengthening practical teaching to address the theory practice gap. To resolve the prominent imbalance between theory and practice, a systematic practical teaching module was established. Each chapter was supported by practical tasks such as decision case analysis, real-world problem modeling, decision-support software applications, and group practice projects, enabling students to understand theories through application and master methodological tools in practice. Case-based teaching was closely connected with real decision-making scenarios in enterprise management, public administration, and engineering management, promoting effective alignment between theoretical methods and real-world needs and enhancing students' practical and professional skills. Throughout the practical teaching process, instructors provided continuous supervision and formative feedback, offering timely evaluation and correction to ensure effective implementation and fundamentally address the theory–practice disconnection.

Fourth, optimizing the assessment system with process orientation and competency focus. A diversified and process-oriented assessment system was established by appropriately reducing the weight of final examinations and significantly increasing the proportion of formative assessments, including literature reading, classroom presentations, group assignments, practical tasks, and course papers. A comprehensive evaluation model combining continuous performance, process-based tasks, and final assessment was formed. Emphasis was placed on research and practical competencies by incorporating literature review, academic writing, practical application, and innovative thinking into

core evaluation indicators. Assessment shifted from testing rote memorization toward evaluating literature comprehension, academic expression, problem-solving ability, and innovative thinking. Open and flexible assessment formats, such as open-book examinations, course papers, and practice reports—were adopted to reduce reliance on closed-book exams, better aligning assessment practices with student preferences and graduate competency development requirements while enhancing the scientific validity and developmental orientation of the evaluation system.

5. Conclusion

This study examined the graduate course Decision Theory and Methods based on a comprehensive teaching quality questionnaire survey, conducting a systematic analysis of the current teaching status, key problems, and reform strategies. The results indicate that overall teaching quality and student satisfaction are relatively high, with strong recognition of the instructor's teaching attitude, professional competence, and instructional organization. Clear course objectives and standardized teaching practices provide a solid foundation for further improvement. However, several issues remain, including insufficient integration of frontier content and research training, an imbalance between theory and practice, limited interaction and student-centered learning, and the need for more process-oriented and competency-based assessment.

To address these issues, this study proposes a systematic reform framework centered on literature-integrated teaching. Key measures include reconstructing course content and integrating frontier research, adopting a "theory–discussion–practice" teaching model, strengthening practical teaching modules and case-based learning, and optimizing diversified, process-oriented assessment systems. These reforms aim to enhance course frontier relevance, student engagement, practical competence, and innovation capability.

Grounded in empirical survey data, the proposed reforms closely align with student needs and identified teaching weaknesses, offering strong practicality and applicability. The findings provide valuable guidance for improving teaching quality in Decision Theory and Methods and offer reference insights for teaching reform in other graduate-level management courses. Future research may conduct follow-up surveys to evaluate reform effectiveness and establish a continuous improvement cycle integrating investigation, reform, evaluation, and refinement to support high-quality graduate education development.

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